

Workshop Manual

Octavia II 2004 ➤

Octavia II 2010 ➤

2.0/81; 103 kW TDI CR Engine (2nd generation)

Engine ID	CLC A	CLC B	CFH C	CFH F				
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Edition 01.2011



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Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.



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00 – Technical data

1 Technical data

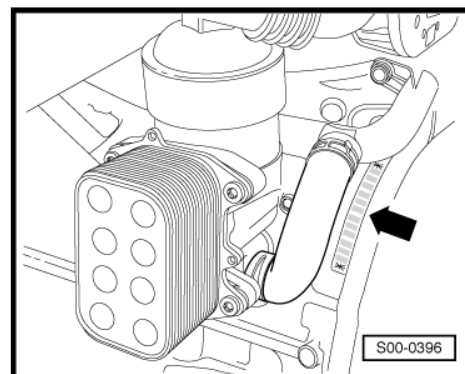
1.1 Engine number

The engine number („engine identification characters“ and „serial number“) is located in the front at the engine/gearbox joint -arrow-.

In addition, a sticker with the „engine identification characters“ and „serial number“ is affixed to the timing belt guard.

The engine identification characters are also indicated on the vehicle data sticker.

- ◆ The engine identification characters have 4 digits starting with the letter „C“.
- ◆ The first 3 digits of the engine identification characters refer to the displacement and the mechanical construction of the engine. They are type-punched in the cylinder block including the serial number.
- ◆ The 4th digit refers to the output and torque of the engine and depends upon the engine control unit.



1.2 Engine characteristics

Engine identification characters	CLCA	CLCB	CFHC	CFHF
Manu- factured	03.2010 ➤	03.2010 ➤	05.2010 ➤	01.2011 ➤
Exhaust limit values con- forming to	EU-4 / BS-4	EU-4 / BS-4	EU5	EU5
Dis- place- ment	1,968	1,968	1,968	1,968
Power kW at rpm	81/4200	103/4200	103/4200	81/4200
Torque Nm at rpm	250/1500...2500	320/1750...2500	320/1750 ... 2500	280/1750 ... 2750
Bore Ø mm	81	81	81	81
Stroke mm	95,5	95,5	95,5	95,5
Cylinder / valves per cyl- inder	4/4	4/4	4/4	4/4
Compression ratio	16,5	16,5	16,0	16,0
Firing order	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2
Catalytic convert- er	yes	yes	yes	yes
Exhaust gas recirculation with radiator	yes	yes	yes	yes
Turbo- charging	yes	yes	yes	yes
Charge air cooler	yes	yes	yes	yes
Diesel particle filter	no	yes	yes	yes

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01 – Self-diagnosis

1 Self diagnosis, safety measures, cleanliness regulations and directions

1.1 Self-diagnosis

This Rep.-Gr. is deleted.

For this use the „Vehicle self-diagnosis“, „Measuring method“ and „Fault finding“ ⇒ Vehicle diagnostic, testing and information system VAS 5051.

1.2 Supplementary instructions and assembly work on vehicles with an air conditioning system



WARNING

Do not open the refrigerant circuit of the air conditioning system.



Note

In order to avoid damage to the condenser as well as to the refrigerant lines and hoses, ensure that the lines and hoses are not over-tensioned, kinked or bent.

Steps which should be taken in order to remove and install the engine without opening the refrigerant circuit.

- Unscrew the holding clamp(s) on the refrigerent lines
- Remove V-ribbed belt ⇒ [page 27](#) .
- Remove AC compressor from the bracket for auxiliary units ⇒ [page 24](#) .
- Mount the air conditioning compressor and the condenser in such a way that the refrigerent lines/hoses are not under tension.

1.3 Regulations concerning safety precautions when working on the fuel system



WARNING

When undertaking all assembly work, particularly in the engine compartment due to its cramped construction, please observe the following:

- ◆ Lay lines of all kinds in such a way that the original line guide is re-established.
- ◆ Ensure that there is adequate free access to all moving or hot components.
- ◆ The fuel or the fuel lines in the fuel system can become very hot (risk of burning)!
- ◆ The fuel system is under pressure!
- ◆ Wear safety goggles and safety clothing, in order to avoid injuries and skin contact with fuel.
- ◆ Place cleaning cloths around the connection point before detaching cable connections. Reduce pressure by carefully removing the wiring.

For reasons of safety the current supply to the fuel pump must be interrupted before opening the fuel system. Otherwise the fuel pump is activated when opening the driver's door. One of the following options must be used to interrupt the current supply:

- ◆ Disconnect battery

or

- ◆ Take out fuse for fuel pump relay -J17-

or

- ◆ Disconnect the plug on the flange of the fuel delivery unit

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Caution

In order to avoid the high pressure pump to run dry and to achieve a quick engine start after parts are replaced, the following points must be observed:

- ◆ If the fuel system was opened, starting with the fuel tank through to the high pressure pump, the ventilation of the fuel system must be carried out before starting the engine. For this purpose, switch on the ignition and only switch it off once the fuel pump has come to a standstill. Repeat this procedure at least »5 times«.
- ◆ If the high pressure pump is removed or replaced, the initial fuel filling of the high pressure pump must be carried out before the first engine start ⇒ [page 189](#) .
- ◆ If the high pressure system was opened, it must be checked for tightness ⇒ [page 190](#) .

When removing and installing the fuel gauge sender or the fuel delivery unit from a full or partly filled fuel tank, pay attention to the following points:

- ◆ The extraction hose of an exhaust extraction system which is switched on, must be positioned close to the assembly open-



ing of the fuel tank in order to extract the released fuel vapours, even before the work is commenced. If no exhaust extraction system is available, a radial fan (motor not in air flow of fan) with a delivery volume of more than 15 m³/h must be used.

- ◆ Avoid skin contact with fuel! Wear fuel-resistant gloves!

If test and measuring devices are required during test drives observe the following:

- ◆ Always secure the test and measuring devices on the rear seat and have a second person operate them there.

If the test and measuring devices are operated from the passenger seat, the passenger can be injured by the release of the passenger airbag in the event of an accident.

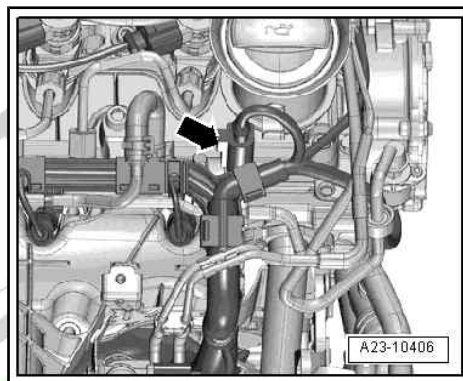


WARNING

Secure the diagnostic device to the rear seat and operate from that position.

Observe the following points to prevent injury to persons and/or damage to the injection and preheating system:

- ◆ People, who have a heart pacemaker implant, should not bend over the engine compartment when the engine is running, as the injection units (solenoid valve injectors) generate an output high voltage pulse.
- ◆ No fuel lines must be opened when the engine is running.
- ◆ Disconnect and connect wires of the preheating and injection system as well as measuring device wires when the ignition is switched off.
- ◆ Do not carry out engine wash unless the ignition is switched off.
- ◆ If the engine must be operated, without it starting, unplug the connector -arrow- at the fuel pressure regulating valve - N276- .
- ◆ Switch off the ignition before disconnecting and connecting the battery, as this may damage the 4AV control unit.
- ◆ After connecting the battery, carry out certain additional operations ⇒ Electrical System ⇒ Rep. gr. 27 .



1.4 Regulations concerning cleanliness when working on the fuel supply/fuel injection system

Carefully observe the following „6 rules“ for cleanliness when working on the fuel supply/injection system:

- ◆ Thoroughly clean the connection points and their surroundings before releasing.
- ◆ Place removed parts on a clean surface and cover. Do not use fuzzy cloths!
- ◆ Carefully cover or close opened components if the repair is not completed immediately.
- ◆ Only install clean parts: Remove spare parts from their wrapping immediately before installing. Do not use any parts which have been stored unwrapped (e.g. on a shelf or in a tool box etc...).

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- ◆ When the system is opened: Avoid using compressed air. Avoid moving the vehicle.
- ◆ Also make sure no diesel fuel runs onto the coolant hoses. If this is the case clean the hoses immediately. Replace immediately any hoses which have suffered damage.

1.5 Regulations concerning cleanliness when working on the exhaust gas turbocharger

Carefully observe the following „5 rules“ for cleanliness when working on the exhaust gas turbocharger:

- ◆ Thoroughly clean the connection points and their surroundings before releasing.
- ◆ Place removed parts on a clean surface and cover. Do not use fuzzy cloths!
- ◆ Carefully cover or close opened components if the repair is not completed immediately.
- ◆ Only install clean parts: Remove spare parts from their wrapping immediately before installing. Do not use any parts which have been stored unwrapped (e.g. on a shelf or in a tool box etc...).
- ◆ When the system is opened: Avoid using compressed air. Avoid moving the vehicle.

1.6 General instructions for charge air system



WARNING

When undertaking all installation work, particularly in the engine compartment because of its cramped construction, please observe the following:

- ◆ *Lay lines of all kinds (e.g. for fuel, hydraulic fluid, cooling fluid and refrigerant, brake fluid, vacuum) and electrical lines in such a way that the original line guide is re-established.*
- ◆ *Ensure that there is adequate free access to all moving or hot components.*

**Caution**

In case a mechanical damage to the exhaust gas turbocharger is found, e.g. damage to the compressor wheel, it is not sufficient to only replace the turbocharger. In order to avoid consequential damage, perform the following tasks:

- ◆ *Clean all oil lines.*
- ◆ *Change engine oil and oil filter.*
- ◆ *Check air filter, air filter insert and charge air hoses as well as charge air pipes for soiling.*
- ◆ *Check all the air guides and the charge air cooler for foreign bodies.*

If foreign bodies are detected in the charge air system, the complete charge-air routing must be cleaned and if necessary the charge air cooler must also be replaced.

- ◆ The charge-air system must be tight, check ⇒ [page 178](#) .
- ◆ Replace the gaskets, the sealing rings and the self-locking nuts.
- ◆ Hose connections and hoses of the charge air system must be free of oil and grease before being installed.
- ◆ Observe markings on the hoses and components.
- ◆ All hose connections of the charging system are secured with screw clamps.
- ◆ Only install approved clamps for securing the hose connections ⇒ Electronic Catalogue of Original Parts .
- ◆ Observe the instructions for installing the charge air hoses and tightening torques of the screw clamps ⇒ [page 177](#) .
- ◆ Before screwing down the oil feed line, fill the exhaust turbocharger via the connection fitting with engine oil.
- ◆ After installing the exhaust turbocharger, run engine at idling speed for about 1 minute to ensure that oil is supplied to the turbocharger bearing.

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10 – Removing and installing engine

1 Removing and installing engine

1.1 Removing and installing engine trim panel

Removing



Caution

The brackets of the engine cover on the cylinder head cover can break off when they are incorrectly removed.

- ◆ *It is therefore necessary to remove the engine cover according to the following instruction.*

- Successively slacken the engine cover in the marked sequence -1 ... 4- from the fixing points. To do so, grip the engine cover from underneath as far as possible in the area of the -arrows- and pull it upwards out of the attachment.

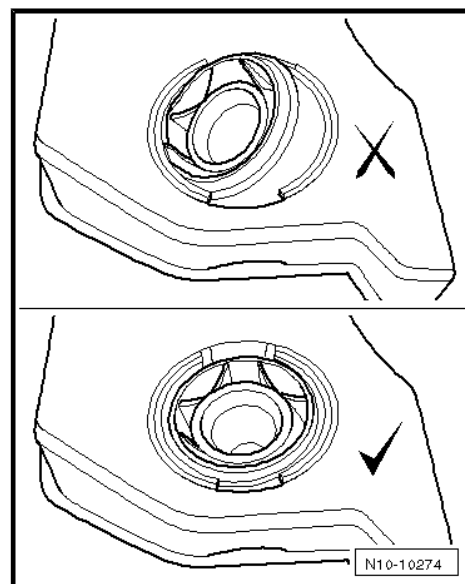
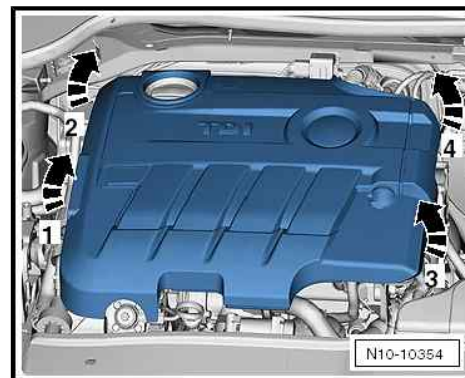
Install



Caution

Before installing the engine cover, check the correct fitting position of the 4 fixing elements (ball sockets), if necessary move them into the correct position. Otherwise this can lead to damage to the engine cover.

- If necessary, adjust the ball sockets of the engine cover to the correct position.
- Position the engine cover onto the fixing points and press it in at the corners until it clicks into place.



1.2 Removing engine

Special tools and workshop equipment required

- ◆ Removal tool for inner lining of the door panel -MP8-602/1-

- ◆ Engine mount -T10012- private or commercial purposes, in part or in whole, is not permitted unless authorised by ŠKODA AUTO A. S. ŠKODA AUTO A. S. does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by ŠKODA AUTO A. S. ®



- ◆ Engine/gearbox jack , e.g. -V.A.G 1383 A-
- ◆ Catch pan , e.g. -VAS 6208-
- ◆ Double ladder , e. g. -VAS 5085-
- ◆ Pliers for spring strap clamps

**Note**

- ◆ *The engine is removed downwards together with the gearbox.*
- ◆ *All cable straps that have been loosened or cut open when the engine was removed must be attached again in the same location when the engine is installed again.*
- ◆ *Leave the ignition key in the ignition lock so that the steering lock does not click into place.*
- ◆ *Collect drained coolant in a clean container for proper disposal or reuse.*

**Caution**

When undertaking all installation work, particularly in the engine compartment because of its cramped construction, please observe the following:

- ◆ ***Lay lines of all kinds (e.g. for fuel, hydraulic fluid, cooling fluid and refrigerant, brake fluid, vacuum) and electrical lines in such a way that the original line guide is re-established.***
- ◆ ***Ensure that there is adequate free access to all moving or hot components.***

Observe all safety measures and notes for assembly work on the fuel and injection system, the charge air system as well as the rules for cleanliness ⇒ [page 2](#) .

- If present, take the adapter for the anti-theft wheel bolts out of the luggage compartment.
- Disconnect the battery-earth strap with the ignition off ⇒ Electrical System ⇒ Rep. gr. 27 .
- Remove engine cover ⇒ [page 7](#) .
- Remove air filter, air mass meter -G70- and suction hose ⇒ [page 214](#) .
- Remove battery with battery tray ⇒ Electrical System ⇒ Rep. gr. 27 .

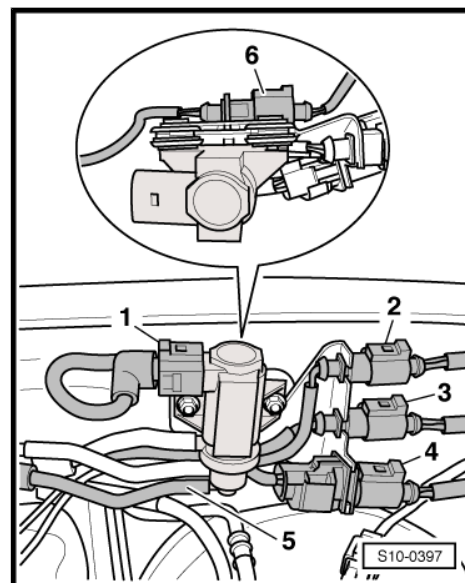
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Engine with identification characters CFHC, CFHF

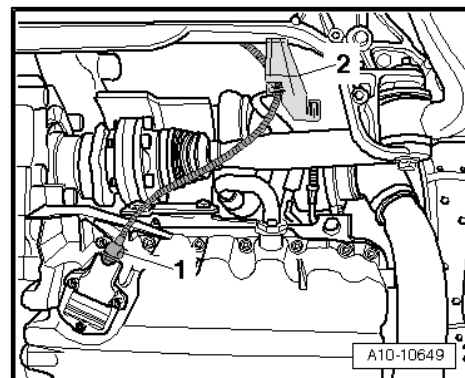
- Unplug the following plug connections at the bulkhead:
- 2 - Exhaust gas temperature sender 4 -G648- (orange)
- 3 - Exhaust gas temperature sender 1 -G235- (Temperature sender upstream turbocharger -G507 -) (black)
- 4 - Lambda probe -G39- (black)
- 6 - Exhaust gas temperature sender 3 -G495- (braun)

Continued for all engines

- Pull off the vacuum hose -5- from the charge pressure control solenoid valve -N75 - .
- Drain coolant ➔ [page 115](#) .



- Disconnect plug -1- from oil level and oil temperature sender -G266- .
- Remove bracket -2- for the wiring harness of the oil level and oil temperature sender -G266- from the assembly carrier.

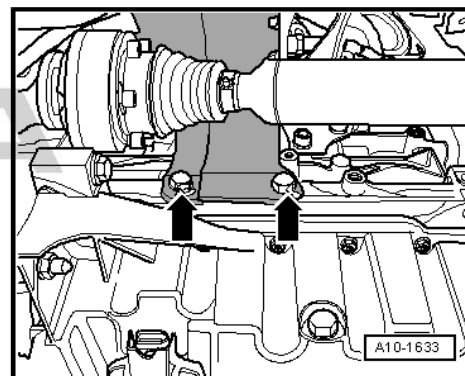


Vehicles with front-wheel-drive

- If present, unscrew heat shield for right drive shaft -arrows-.

Continued for all vehicles

- Unscrew left front wheel.
- Remove the right and left wheelhouse liner ➔ Body Work ➔ Rep. gr. 66 .
- Unscrew the left drive shaft from the flange shaft of the gear-box.
- Remove pre-exhaust pipe:
- ♦ Engine identification characters CFHC, CFHF ➔ [page 225](#)
- ♦ Engine identification characters CLCA, CLCB ➔ [page 228](#)



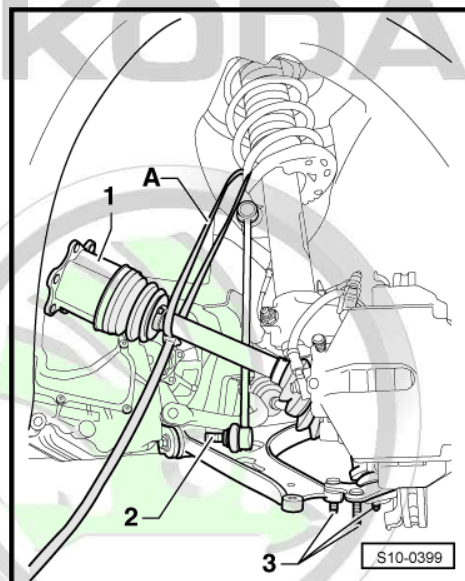
Vehicles with four-wheel drive

- Unscrew propshaft from angle gearbox ➔ Gearbox ➔ Rep. gr. 39 .

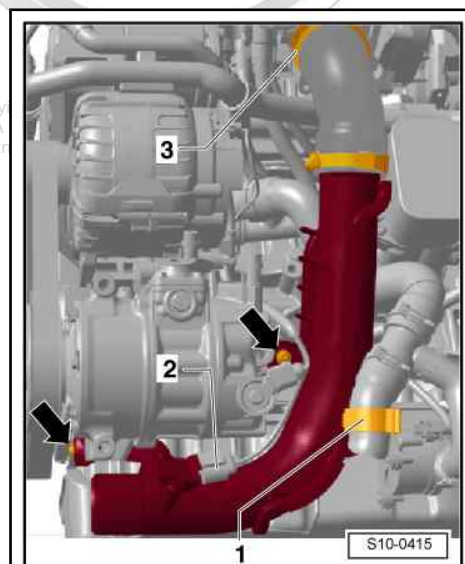
Continued for all vehicles



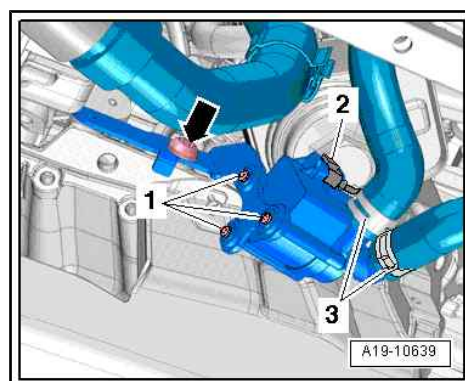
- Swivel the steering joint outwards and secure the drive shaft -1- with a band -A- in the wheelhouse. The assembly carrier is already removed.



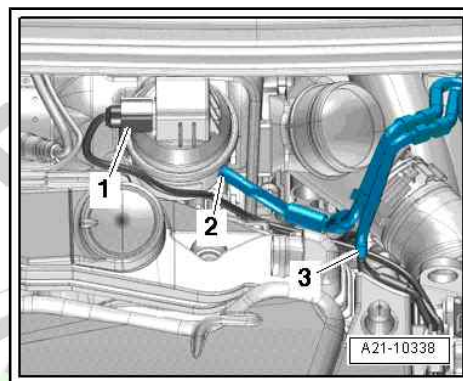
- Release screws -arrows-.
- Expose coolant hose -1-.
- Loosen hose clamp -3-.
- Disconnect plug -2- at the charge pressure sender -G31- and remove the right charge air pipe.



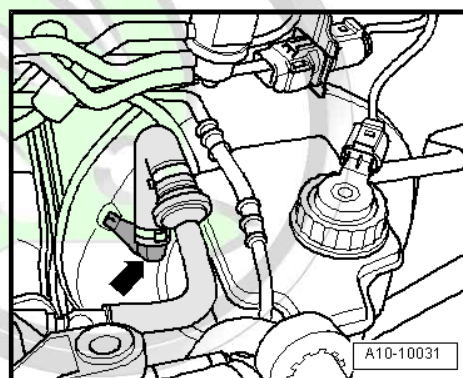
- Unscrew screw -arrow- and push the coolant recirculation pump 2 -V178- to the side.



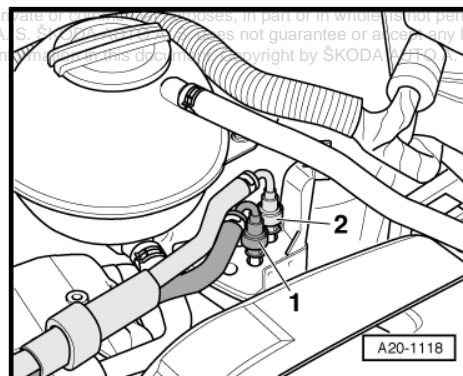
- Remove vacuum hose -2- from vacuum setting element of exhaust turbocharger.
- Disconnect vacuum hose -3-.



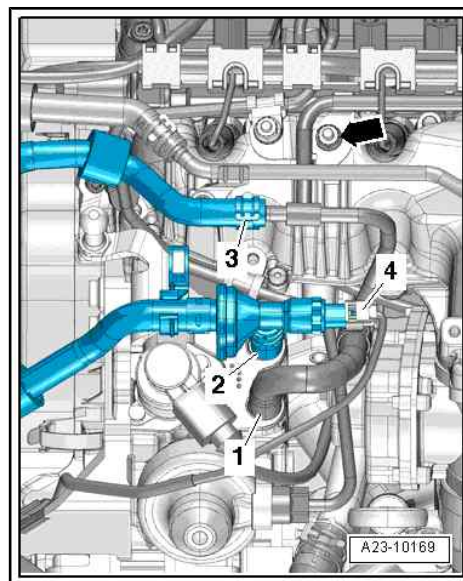
- Remove the vacuum hose -arrow- from the brake servo unit.



- Separate fuel feed line -2- and fuel return-flow line -1-, to do so press in securing rings.



- Disconnect plug -4- at fuel temperature sender -G81- .
- Remove fuel feed line as well as fuel return-flow line, to do so loosen hose clamps -2 and 3-.



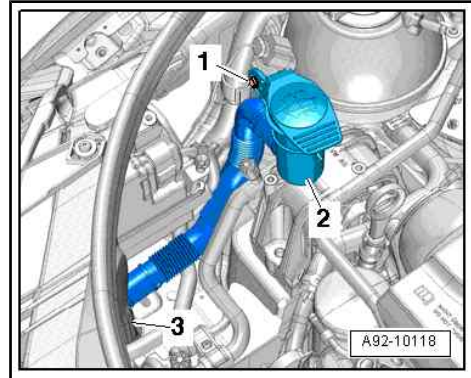


- Unscrew bolt -1-.
- Push the filler tube with the filler neck -2- for the washer-fluid reservoir to the side.

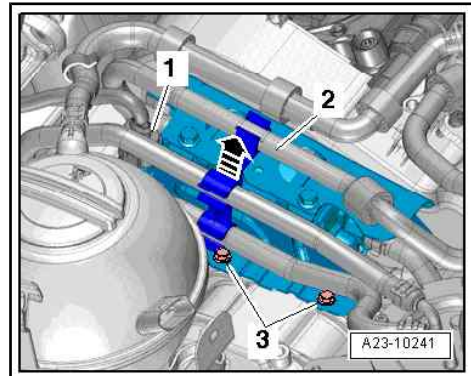


Note

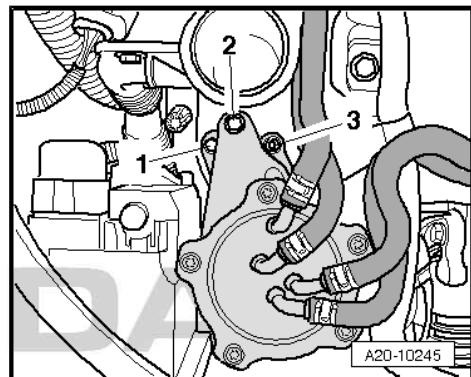
For reasons of clarity the fuel filter is not shown.



- Unhook the fuel hose -2- from the bracket.
- Remove the bracket for the fuel lines upwards in -direction of arrow- and place it to the side.
- Disconnect plug -1- from the additional fuel pump -V393- .
- Unscrew bolts -3-.



- Loosen screw -1- by 2 turns.
- Release screw -2- and nut -3-.
- Unclip bracket for coolant line at fuel filter.
- Remove the fuel filter with the hoses connected and the bracket together with the additional fuel pump -V393- .



Vehicles with air conditioning

- Remove V-ribbed belt ➔ [page 27](#) .



WARNING

Risk of injury through refrigerant.

- ◆ *Do not open the refrigerant circuit of the air conditioning system.*



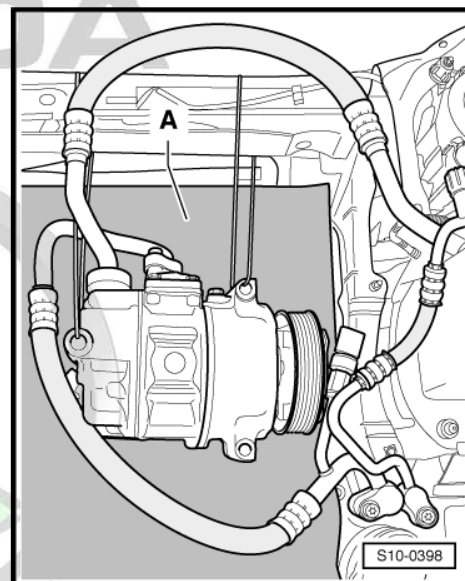
Note

In order to avoid damage to the AC compressor as well as to the refrigerant lines and hoses, ensure that the lines and hoses are not over-tensioned, kinked or bent.

- Remove the AC compressor from the bracket for auxiliary units, to protect the charge air cooler place cardboard -A- on it and secure the AC compressor with connected refrigerant hoses to the lock carrier.

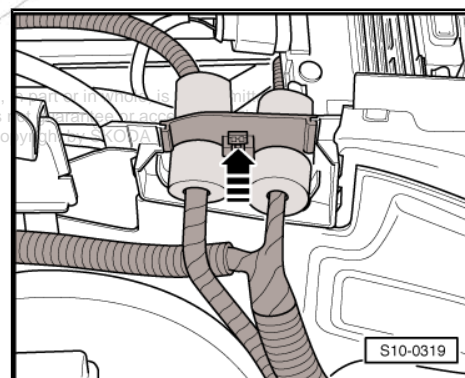
Continued for all vehicles

- Unlatch the fuse and disconnect the front plug from the engine control unit ➔ [page 216](#) .

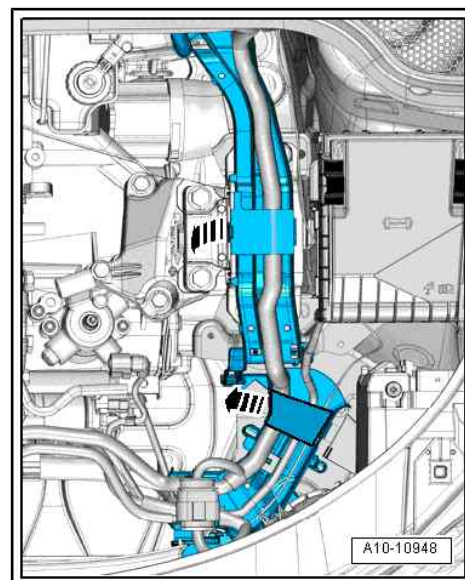


- Release duct for engine wiring harness -arrow- and pull out upwards.

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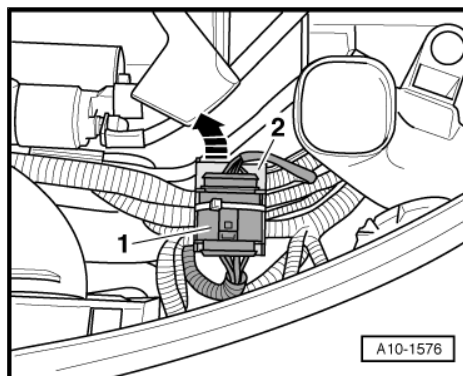


- Open the cable guides -arrows-, remove the engine wiring harness and place down to the side.





- Expose the plug connection -1- and disconnect it.
- Open the bracket -2- lying below the cable guide.
- Remove the wiring loom to the engine control unit from the cable guide using the removal tool -MP8-602/1- and lay it on the engine.

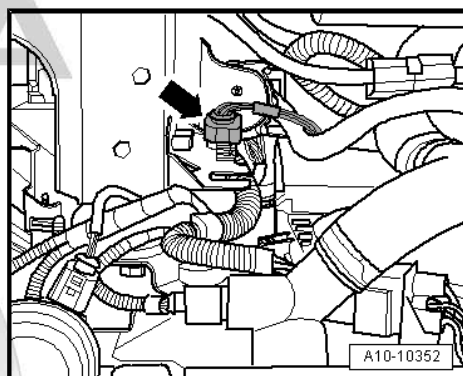


- Disconnect plug connection -arrow- at the bottom left frame side rail.

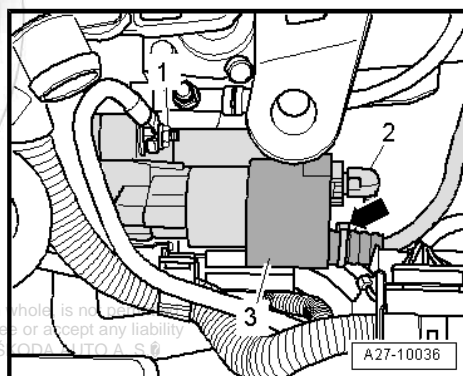


Note

For purposes of presentation, the fitting position is shown from below.



- Remove the cable strap of the -arrow- protective cover, if present.
- Unbolt earth strap -1-.
- Unplug connector -2-.
- Pull back the protective cover and unscrew the cable from the solenoid switch of the starter.
- Disconnect further necessary plug connections at the engine and gearbox or line connections to engine and gearbox.



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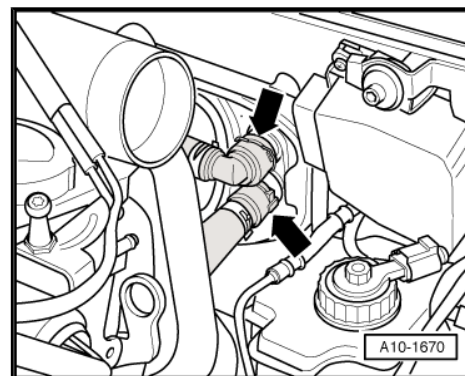
- Separate the quick couplings -arrows- at the heat exchanger.
- Pull off coolant hose from the top and bottom of the coolant expansion reservoir.

Vehicles with auxiliary heating.

- Place a catch pan for coolant under the auxiliary heating.
- Detach the coolant hoses of the auxiliary heating.

Vehicles fitted with a manual gearbox

- Remove shift mechanism from gearbox ⇒ gearbox ⇒ Rep. gr. 34 .
- Remove pressure line from breather/slave cylinder ⇒ Gearbox ⇒ Rep. gr. 30 .



WARNING

After separating the hydraulic line, do not operate the clutch pedal.

Vehicles with automatic gearbox

- Remove shift mechanism from gearbox ⇒ Automatic Gearbox ⇒ Rep. gr. 34 .

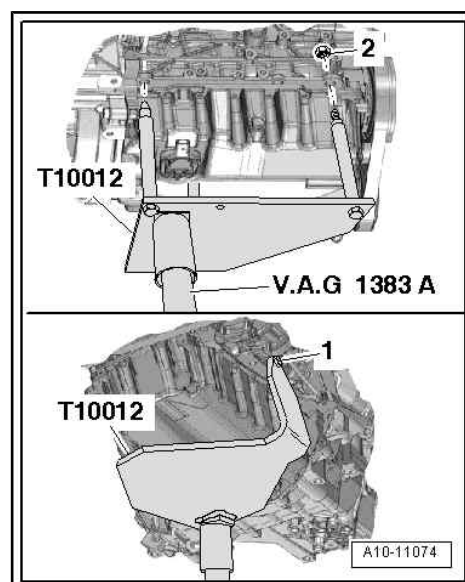
Continued for all vehicles

- Unclamp all remaining connecting, coolant, vacuum and suction hoses from the engine.
- Release all remaining plugs at engine and gearbox and lay aside the relevant lines.
- Screw engine mount -T10012- to the cylinder block with nut -2- and screw -1- to 20 Nm.
- Insert engine/gearbox jack -V.A.G 1383 A- in the engine mount and slightly raise.



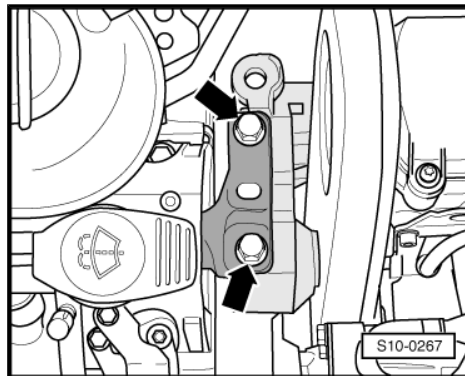
Note

Use the double ladder to release the screws for the engine/gearbox mounting.





- Successively release screws for engine mount -arrows-.

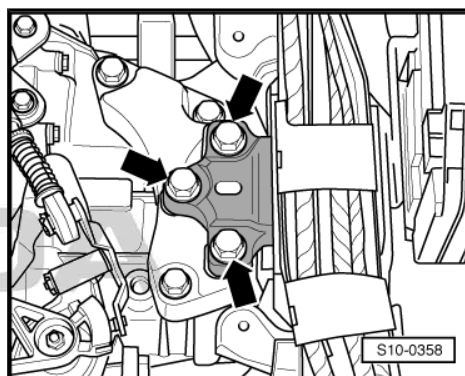


- Successively release screws for gearbox mount -arrows-.



Note

- ◆ Check whether all hose and line connections between engine, gearbox and body are released.
- ◆ When lowering carefully guide the engine with the gearbox, in order to avoid damage.
- Carefully lower engine with gearbox. During this procedure, turn or move the engine with the gearbox depending upon the constriction.
- Remove the gearbox from the engine.



1.3 Securing the engine to the assembly stand

Special tools and workshop equipment required

- ◆ Engine mount -MP1-202- or -VAS 6095-
- ◆ Hook -MP1-202/10-
- ◆ Assembly stand -MP9-101-
- ◆ Lifting device -MP9-201 (2024A)-
- ◆ Bushing -T30010 (VW 540/1B)-
- ◆ Workshop crane , e.g. -VAS 6100-
- Separate engine from gearbox.



WARNING

Use securing pins on the hooks and rig pins to prevent release.

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- Attach lifting device -MP9-201- at engine and at workshop crane e.g. -VAS 6100- .

belt pulley side

- ◆ 2. Hole of the attachment in Position 1

Flywheel side

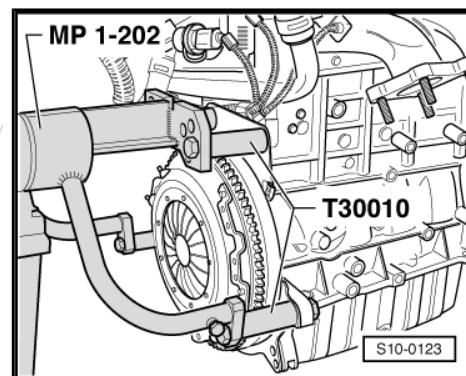
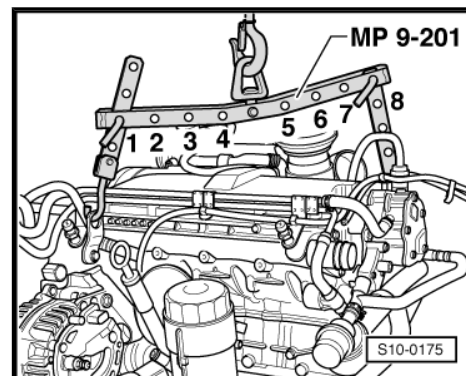
- ◆ 4. Hole of the attachment in Position 8



Note

The illustration shows a pump injector engine. The attachment for the Common Rail engine occurs in the same way.

- Lift off engine with installed engine mount -T10012- with workshop crane from engine/gearbox jack.
- Remove engine mount -T10012- .
- For carrying out assembly work, attach the engine with engine mount -MP1-202- , hooks -MP1-202/10- and sleeves -T30010- or engine mount -VAS 6095- to the assembly stand -MP9-101- . The figure shows the 1.9 ltr./47 kW SDI Engine. The fixing system is identical.



1.4 Installing the engine

Special tools and workshop equipment required

- ◆ Grease -G 000 100- for manual gearbox
- ◆ High temperature grease -G 052 133 A2- for automatic gearbox
- Fit engine with engine mount to engine/gearbox jack .

Installation is performed in the reverse order, pay attention to the following points:



Note

- ◆ *Observe all safety measures and notes for assembly work on the fuel and injection system, the charge air system as well as the rules for cleanliness ➔ [page 2](#) .*
- ◆ *When undertaking assembly replace self-locking nuts and screws which have been tightened to a torquing angle.*
- ◆ *Always replace gasket rings and seals.*
- ◆ *All cable straps should be fastened again in the same place when installing.*
- ◆ *Secure all hose connections with corresponding hose clamps ➔ *Electronic Catalogue of Original Parts* .*



Caution

When undertaking all installation work, particularly in the engine compartment because of its cramped construction, please observe the following:

- ◆ *Lay lines of all kinds (e.g. for fuel, hydraulic fluid, cooling fluid and refrigerant, brake fluid, vacuum) and electrical lines in such a way that the original line guide is re-established.*
- ◆ *In order to avoid damage to the cables, ensure that there is adequate free access to all moving or hot components.*

Vehicles fitted with a manual gearbox



Note

- ◆ *Clean the drive shaft serration and hub serration on a used clutch disc, remove corrosion and only apply a very thin layer of grease -G 000 100- on the serration. Subsequently move the clutch disc up and down on the drive shaft until the hub fits smoothly on the shaft. Always remove excess grease.*
- ◆ *After installing the coupling, check the centering of the clutch disc ⇒ gearbox ⇒ Rep. gr. 30 .*
- ◆ *Check the clutch release bearing for wear. Replace release bearing if worn ⇒ gearbox ⇒ Rep. gr. 30 .*

Vehicles with automatic gearbox

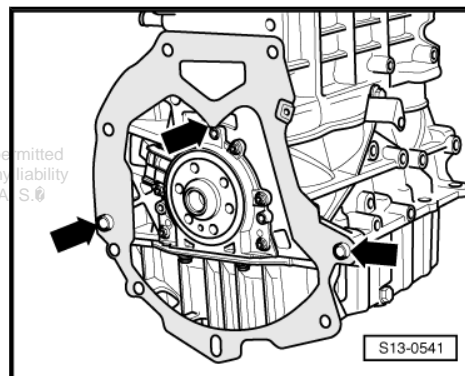
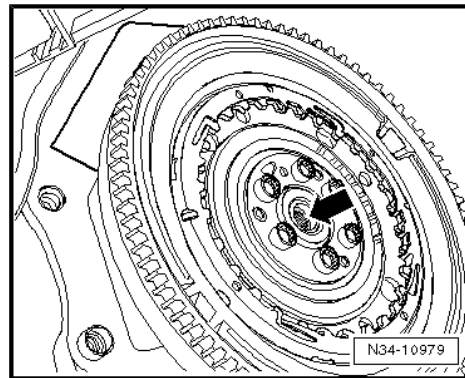


Note

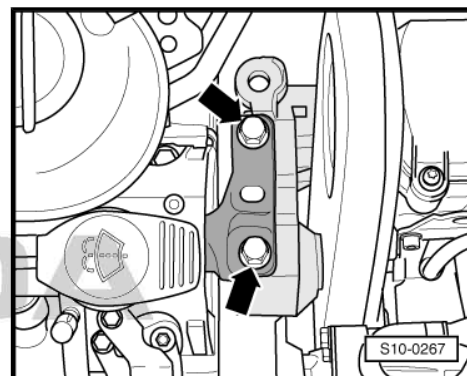
- ◆ *Check needle bearing for drive shaft pin in the crankshaft. Replace bearing if worn ⇒ [page 58](#) .*
- ◆ *Lubricate needle bearing and drive shaft pin with a thin layer of high temperature grease -G 052 133 A2- . Do not grease the serration of the drive shaft.*

Continued for all vehicles

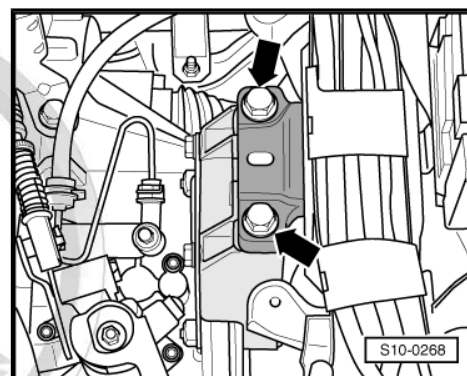
- Check whether the dowel sleeves for centering the engine/gearbox are present in the cylinder block; insert if necessary.
- Ensure that the intermediate plate has been inserted on the sealing flange and is pushed onto the dowel sleeves -arrows-.
- Screw on gearbox to engine ⇒ gearbox ⇒ Rep. gr. 34 .
- Insert engine with gearbox into the body.



- Successively screw in by hand the screws for engine mount -arrows-.



- Successively screw in screws for gearbox mount -arrows- at gearbox 0A4 or ...



... at gearbox 02E -arrows- by hand.

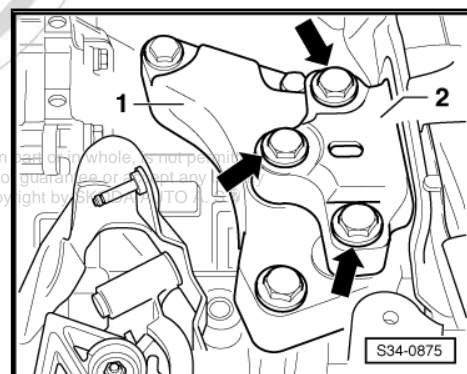
- Align engine and gearbox mount and tighten screws
⇒ [page 22](#) .

- Remove engine mount -T10012- from engine.

- Install pre-exhaust pipe.

- ◆ Engine identification characters CFHC, CFHF ⇒ [page 225](#)

- ◆ Engine identification characters CLCA, CLCB ⇒ [page 228](#)





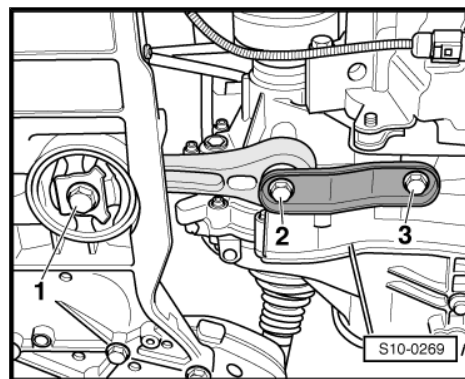
- First screw on pendulum support with new screws -2- and -3- at gearbox and then screw on with new screw -1- at assembly carrier.
- Install the left and right drive shaft ⇒ Chassis ⇒ Rep. gr. 40 .

Vehicles fitted with a manual gearbox

- Connect hydraulic line to breather/slave cylinder and bleed the clutch hydraulic ⇒ Gearbox ⇒ Rep. gr. 30 .
- Attach the shift mechanism to the gearbox and adjust ⇒ Gearbox ⇒ Rep. gr. 34 .

Vehicles with automatic gearbox

- Attach shift mechanism to gearbox ⇒ Automatic Gearbox ⇒ Rep. gr. 34 .



Continued for all vehicles

- Install AC compressor at the bracket for auxiliary units ⇒ [page 24](#) .
- Install the V-ribbed belt ⇒ [page 27](#) .
- Install radiator ⇒ [page 129](#) .
- Install fan shroud with radiator fan ⇒ [page 128](#) , to do so pay attention to the clearance of the radiator fans.
- Connect all connecting, fuel, cooling fluid, vacuum and suction hoses to the engine.
- Connect electrical connections and attach cables ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Carry out cohesive work when reconnecting the battery ⇒ Electrical System ⇒ Rep. gr. 27 .
- Install bulkhead plenum chamber and plenum chamber cover ⇒ Body Work ⇒ Rep. gr. 66 .
- Install wiper arms ⇒ Electrical System ⇒ Rep. gr. 92 .
- Top up coolant ⇒ [page 115](#) .
- Checking the oil level ⇒ Maintenance ; Booklet Octavia II .
- Install the noise insulation ⇒ Body Work ⇒ Rep. gr. 50 .
- Install the left and right wheelhouse liner bottom part ⇒ Body Work ⇒ Rep. gr. 66 .
- Perform a test drive.
- Interrogate the fault memory of the engine control unit, if necessary remove any faults which exist and delete the fault memory ⇒ Vehicle diagnostic, testing and information system VAS 5051.



Note

After deleting the fault memory of the engine control unit the readiness code must be re-generated.

Tightening torques

Component		Nm
Screws or nuts	M6	8 (9) ¹⁾
	M7	13 (13) ¹⁾
	M8	20 (20) ¹⁾
	M10	40 (40) ¹⁾
	M12	65 (70) ¹⁾
Engine/gearbox connecting screws ⇒ gearbox ⇒ Rep. gr. 34		

¹⁾ The instruction in the brackets applies to collar screws and collar nuts.

1.5 Assembly bracket

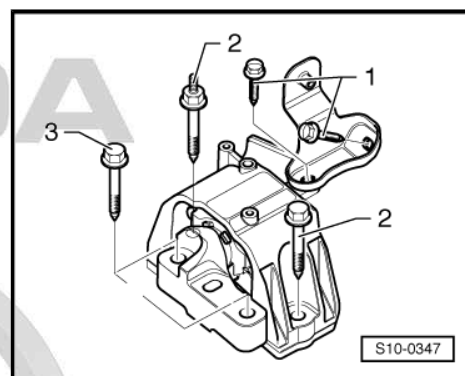
Tightening torques

Assembly bracket

1 - 20 Nm + 90° (1/4 turn) - replace

2 - 40 Nm + 90° (1/4 turn) - replace

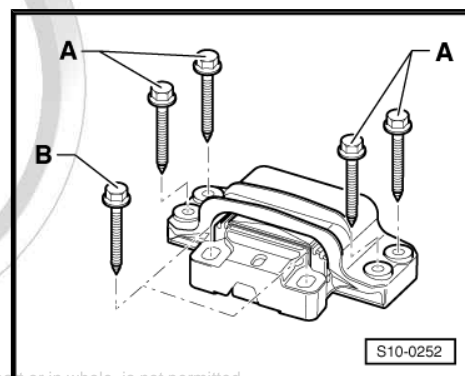
3 - 60 Nm + 90° (1/4 turn) - replace



Gearbox mount 0A4 (MQ 250)

A - 40 Nm + 90° (1/4 turn) - replace

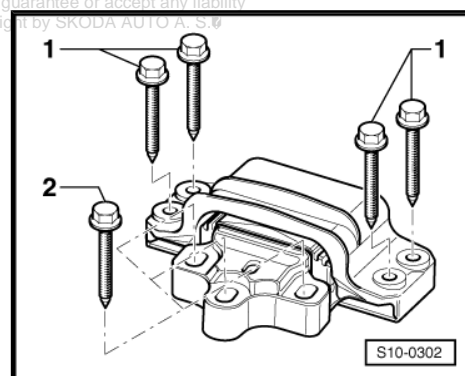
B - 60 Nm + 90° (1/4 turn) - replace



Gearbox mount 02E (MQ 250)

1 - 40 Nm + 90° (1/4 turn) - replace

2 - 60 Nm + 90° (1/4 turn) - replace



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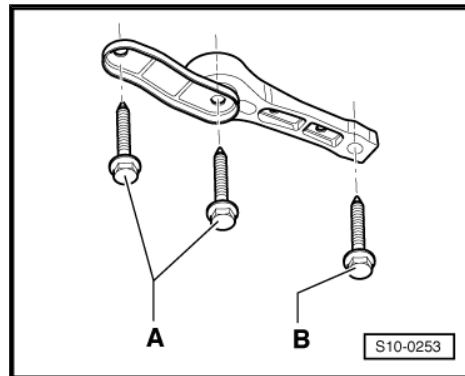
Pendulum support

A - 50 Nm + 90° (1/4 turn) - replace

B - 100 Nm + 90° (1/4 turn) - replace

Remove: First release screw -B-, then screws -A-.

Install: First tighten screws -A-, then screw -B-.



1.6 Adjusting the unit mounting

Special tools and workshop equipment required

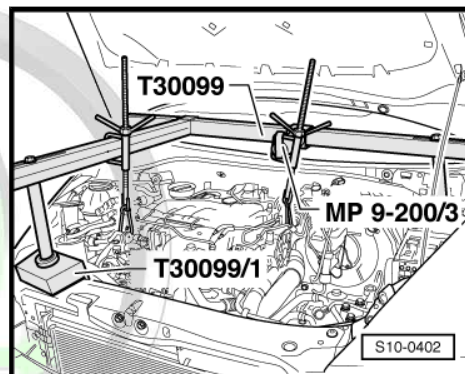
- ◆ Supporting device -T30099-
- ◆ Surface -T30099/1-
- ◆ Adapter -MP9-200/3 (10-222A/3)-

or

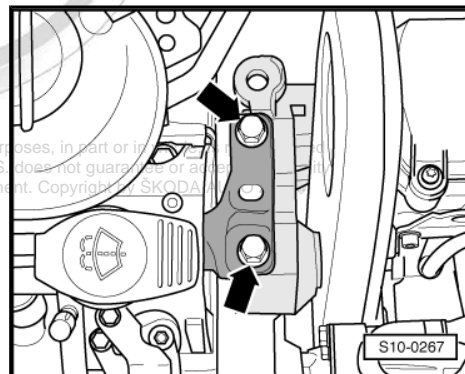
- ◆ Engine mount -T10012-
- ◆ Engine/gearbox jack , e.g. -V.A.G 1383 A-

Precondition

- Engine with gearbox supported with supporting device - T30099- , base -T30099/1- and adapter -MP9-200/3 - or engine with gearbox supported with engine mount -T10012- and engine/gearbox jack -V.A.G 1383 A - .

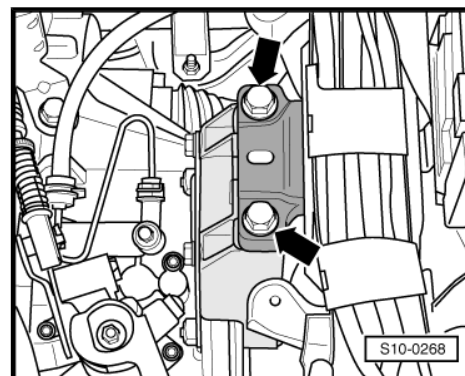


- Slacken screws -arrows- for engine mount by approx. 1 turn.



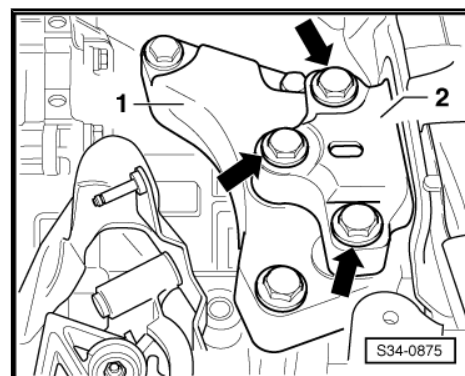
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- Release screws for gearbox mount at gearbox 0A4 -arrows- or ...



... at gearbox 02E -arrows- by approx. 1 turn.

- Successively replace all the screws of the assembly bracket (as long as it has not already been performed when installing) and insert these loosely.



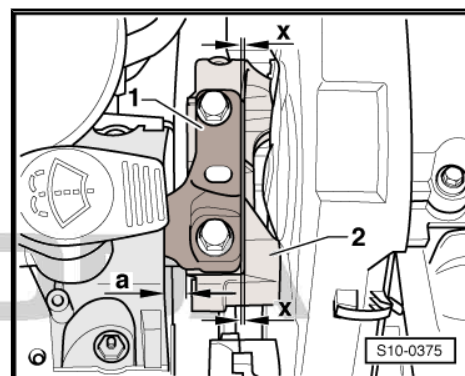
The following dimensions -a- and -x- must be maintained:

- Between engine bracket and engine support there must be a distance -a- = 10 mm.
- The cast iron edge on the engine support -2- must be parallel to the supporting arm -1- the dimension -x- must be the same at the front and rear.



Note

The distance -a- = 10 mm can be checked e.g. with suitable round bars.



- Tighten the screws of the assembly bracket.

Tightening torques of the unit mounting ⇒ [page 21](#) .





13 – Crankshaft group

1 Removing and installing a V-ribbed belt and a toothed belt

1.1 V-ribbed belt drive - Summary of components

1.1.1 Vehicles without air conditioning

1 - Crankshaft-belt pulley

- ☐ with vibration damper
- ☐ pay attention to correct installation position
⇒ [page 25](#)
- ☐ removing and installing
⇒ [page 29](#)

2 - 25 Nm

3 - AC generator

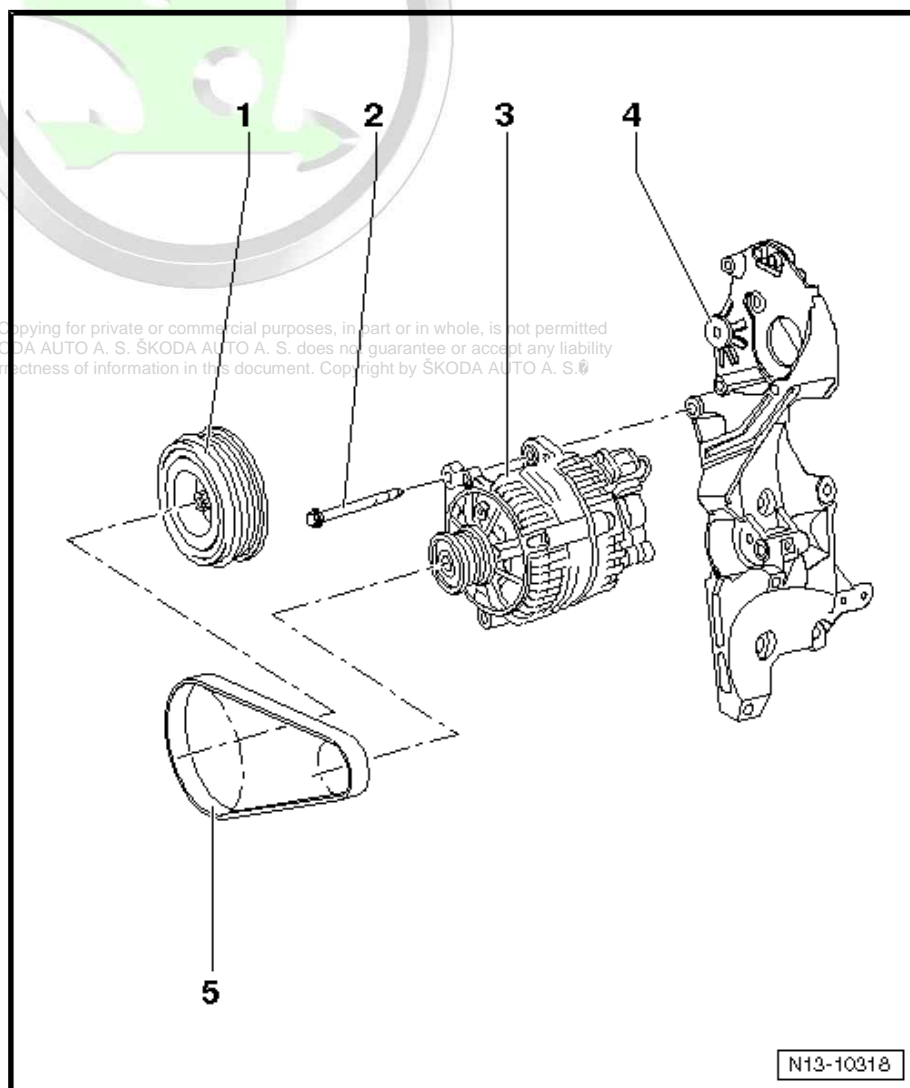
- ☐ removing and installing
⇒ [Electrical System](#) ⇒
Rep. gr. 27

4 - Bracket for auxiliary units

- ☐ order of tightening
⇒ [page 25](#)

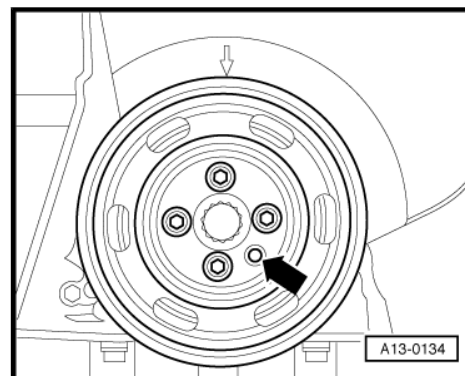
5 - V-ribbed belt

- ☐ removing and installing
⇒ [page 27](#)
- ☐ do not kink
- ☐ check for wear, replace if damaged
- ☐ pay attention to the correct position on the belt pulley when installing it.



Fitting position of the crankshaft-belt pulley

- The hole -arrow- in the crankshaft belt pulley must be positioned above the peg on the crankshaft timing belt sprocket.



Bracket for auxiliary units - tightening order and tightening torques

- A dowel sleeve must be located between the bracket for auxiliary units and the cylinder block in the area of the screw hole -6-.

- Insert new fixing screws for the bracket for auxiliary units as follows:

◆ Screws -1- and -2- M10 x 52

◆ Screws -3- and -4- M10 x 30

◆ Screws -5- and -6- M10 x 60

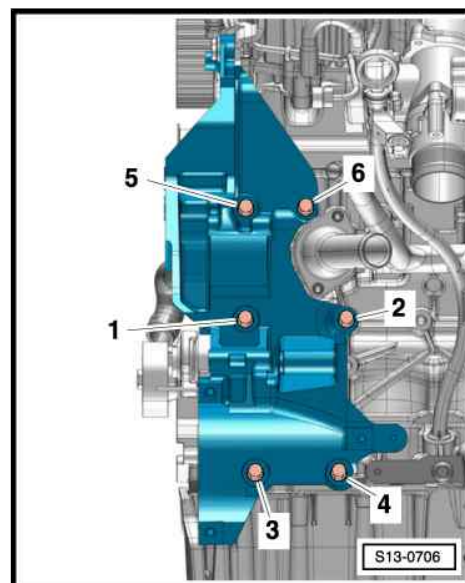
- Gradually tighten the fixing screws for the bracket for auxiliary units in the sequence -1...6-:

1. Screw in all the screws by hand.
2. Tighten all screws to 40 Nm.
3. Torque the screws with a rigid wrench as follows:

Torque screws -1 and 2- a further 90° (1/4 turn.)

Torque screws -3 and 4- a further 45° (1/8 turn.)

Torque screws -5 and 6- a further 90° (1/4 turn.)



1.1.2 Vehicles with air conditioning





1 - Crankshaft-belt pulley

- ☐ with vibration damper
- ☐ pay attention to correct installation position
⇒ [page 26](#)
- ☐ removing and installing
⇒ [page 29](#)

2 - 25 Nm

3 - AC generator

- ☐ removing and installing
⇒ Electrical System ⇒
Rep. gr. 27

4 - Bracket for auxiliary units

- ☐ order of tightening
⇒ [page 27](#)

5 - 20 Nm + torque a further 180° (1/2 turn)

- ☐ replace

6 - Tensioning element

- ☐ for the V-ribbed belt

7 - AC compressor

- ☐ removing and installing
⇒ Heating, Air Conditioning ⇒ Rep. gr. 87

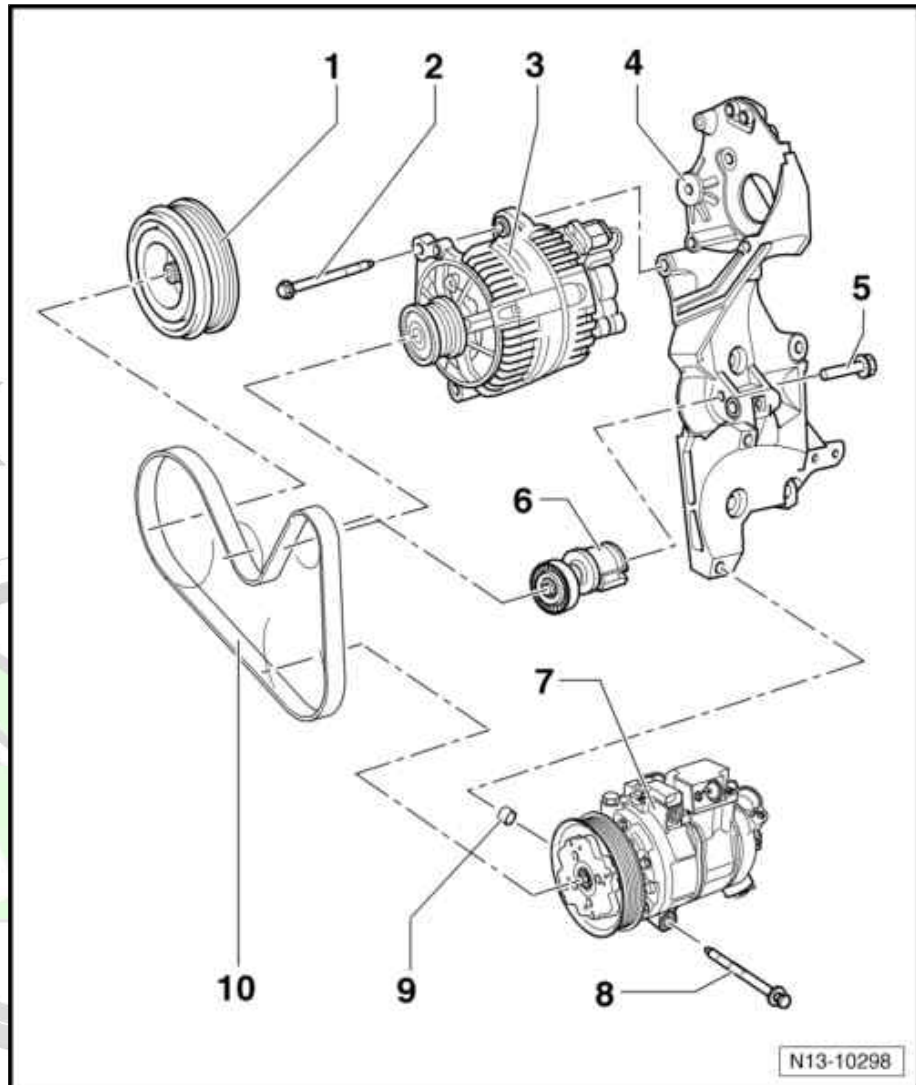
8 - 45 Nm

9 - Fitting sleeve

- ☐ pay attention to correct fit in the holder

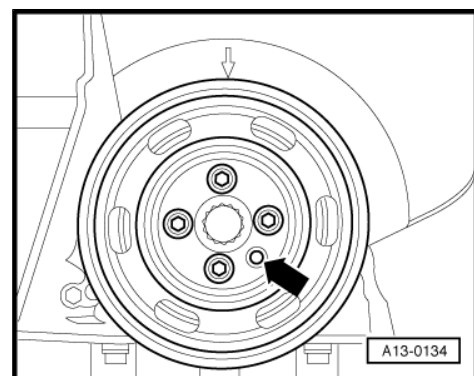
10 - V-ribbed belt

- ☐ mark the direction of rotation with chalk or a felt-tip pen before removing
- ☐ removing and installing ⇒ [page 27](#)
- ☐ check for wear, replace if damaged
- ☐ do not kink
- ☐ pay attention to the correct position on the belt pulley when installing it.



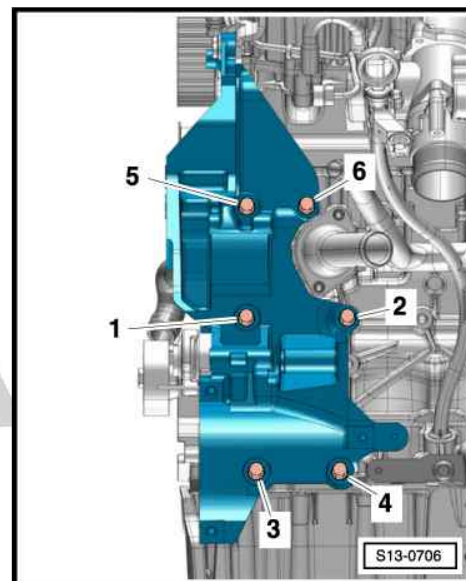
Fitting position of the crankshaft-belt pulley

- The hole -arrow- in the crankshaft belt pulley must be positioned above the peg on the crankshaft timing belt sprocket.



Bracket for auxiliary units - tightening order and tightening torques

- A dowel sleeve must be located between the bracket for auxiliary units and the cylinder block in the area of the screw hole -6-.
- Insert new fixing screws for the bracket for auxiliary units as follows:
 - ◆ Screws -1- and -2- M10 x 52
 - ◆ Screws -3- and -4- M10 x 30
 - ◆ Screws -5- and -6- M10 x 60
- Gradually tighten the fixing screws for the bracket for auxiliary units in the sequence -1...6-:
 1. Screw in all the screws by hand.
 2. Tighten all screws to 40 Nm.
 3. Torque the screws with a rigid wrench as follows:
 - Torque screws -1 and 2- a further 90° ($\frac{1}{4}$ turn.)
 - Torque screws -3 and 4- a further 45° ($\frac{3}{8}$ turn.)
 - Torque screws -5 and 6- a further 90° ($\frac{5}{4}$ turn.)



1.2 Removing and installing V-ribbed belt for vehicles without air conditioning system



Note

The repair kit for the V-ribbed belt includes the assembly device -T10367- and an illustrated ⇒ work procedure .

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Removing

- Remove noise insulation ⇒ Body Work ⇒ Rep. gr. 50 .
- Remove the right wheelhouse liner ⇒ Body Work ⇒ Rep. gr. 66 .
- Cut through V-ribbed belt.

Install

Installation is performed in the reverse order, pay attention to the following points:

- The following work procedure is described in the illustrated ⇒ work procedure .
- Start engine and check ribbed V-belt run.

1.3 Removing and installing V-ribbed belt for vehicles with air conditioning system

Special tools and workshop equipment required

- ◆ Locking pin -T10060 A-

Removing

- Remove noise insulation ⇒ Body Work ⇒ Rep. gr. 50 .
- Remove the right wheelhouse liner bottom part ⇒ Body Work ⇒ Rep. gr. 66 .

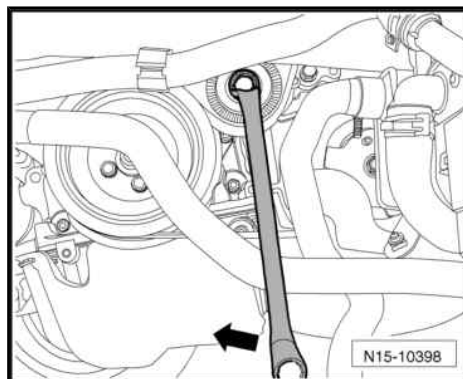


Caution

Risk of damage through reversing the rotation direction of an already used V-ribbed belt.

- ◆ If it is intended to re-install the V-ribbed belt, mark the direction of rotation with chalk or a felt-tip pen before removing it.

- Loosen the V-ribbed belt by swivelling the tensioning element in -the direction of the arrow-.



- Align the holes -arrows- and lock the tensioning element using the locking pin -T10060 A-.
- Remove the V-ribbed belt.

Install

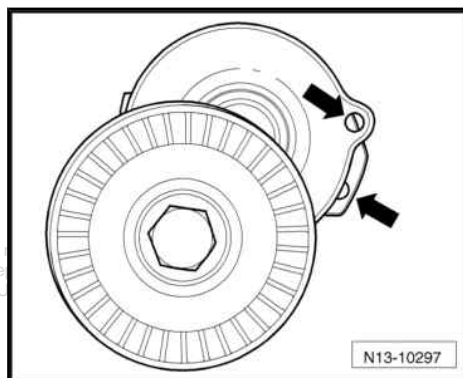
Installation is performed in the reverse order, pay attention to the following points:



Note

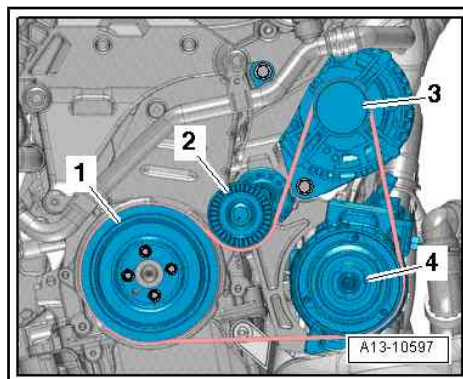
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Before fitting the V-ribbed belt make sure that all assemblies (generator and AC compressor) are securely mounted.

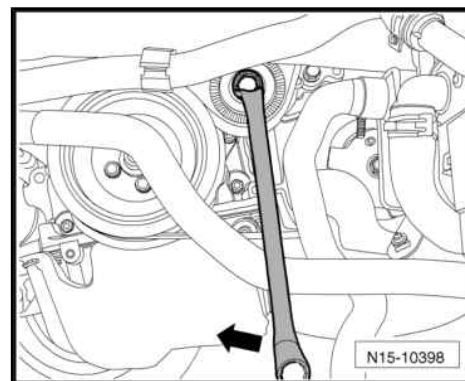


- Lay the V-ribbed belt onto the V-ribbed belt pulleys.

- 1 - Crankshaft belt pulley with vibration damper
- 2 - Tensioning element
- 3 - AC generator
- 4 - AC compressor



- Hold the tensioning element with the ring spanner and pull out the locking pin -T10060 A- .
- Release the tensioning element.
- Check correct positioning of the V-ribbed belt.
- Start engine and check ribbed V-belt run.



1.4 Removing and installing crankshaft-belt pulley

Removing

- Remove V-ribbed belt ➔ [page 24](#) .
- Remove the cover for the vibration damper.
- Loosen the screws -arrows- of the crankshaft belt pulley, to do so hold the screw for the crankshaft timing belt sprocket using the ring spanner.
- Release screws and remove crankshaft-belt pulley.

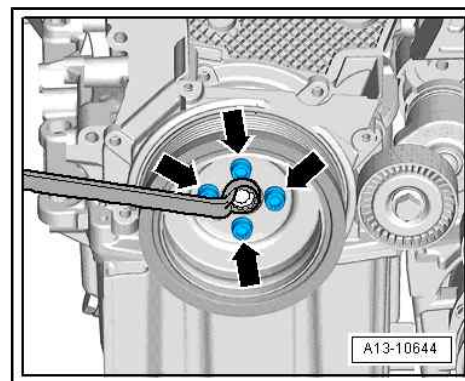
Install

Installation is performed in the reverse order, pay attention to the following points:



Note

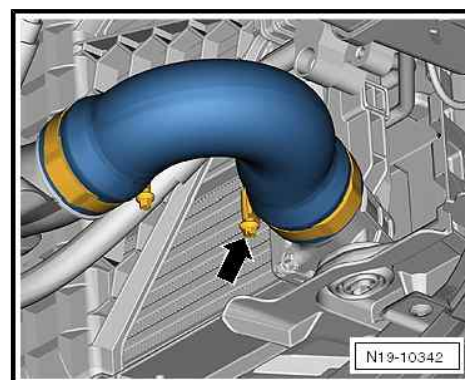
- ♦ Pay attention to the fitting position of the crankshaft belt pulley ➔ [page 26](#) or ➔ [page 25](#) .
- ♦ Replace the screws of the crankshaft belt pulley.
- ♦ Tightening torques: ➔ [page 24](#)



1.5 Removing and installing tensioning element for V-ribbed belt

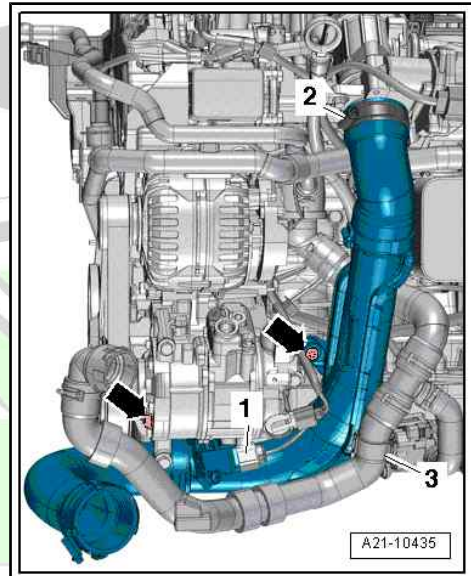
Removing

- Remove V-ribbed belt ➔ [page 27](#) .
- Remove right charge air hose.
- Remove fan shroud with radiator fans ➔ [page 128](#) .





- Release screws -arrows-.
- Expose coolant hose -3-.
- Loosen hose clamp -2-.
- Disconnect the plug -1- at the charge pressure sender -G31- with intake air temperature sender -G42- and remove the right charge air pipe.

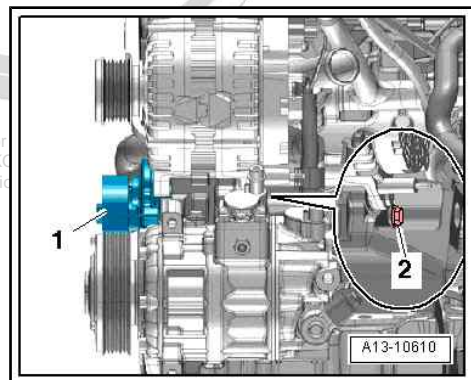


- Unscrew screw -2- and remove tensioning element -1- from V-ribbed belt.

Install

Installation is performed in the reverse order, pay attention to the following points:

- ◆ Tightening torques: ➔ [page 25](#)
- Replace the screw of the tensioning element for the V-ribbed belt.
- Install the V-ribbed belt ➔ [page 27](#) .



1.6 Timing belt drive - Summary of components

1 - Toothed belt

- ☐ before removing mark running direction
- ☐ check for wear
- ☐ do not kink
- ☐ removing and installing
⇒ [page 33](#)



Note

If the toothed belt is replaced when carrying out engine repair (apart from regular change interval) it should be entered in the ⇒ Service Schedule !

2 - 120 Nm + torque a further 90° (1/4 turn)

- ☐ replace
- ☐ to release and tighten use counterholder - T30004 (3415)-
- ☐ Neither oil nor grease thread or collar.
- ☐ tightening may occur in successive stages

3 - Crankshaft - toothed belt sprocket

- ☐ at the crankshaft

4 - 20 Nm

5 - Guide pulley

- ☐ for toothed belt

6 - 20 Nm + torque a further 45° (1/8 turn)

7 - Tensioning pulley

- ☐ for toothed belt
- ☐ for removing and installing, remove engine support ⇒ [page 33](#)

8 - 20 Nm + torque a further 45° (1/8 turn)

9 - Toothed belt gear

- ☐ on the camshaft

10 - 20 Nm

11 - 100 Nm

- ☐ to release and tighten use counterholder -T10051-

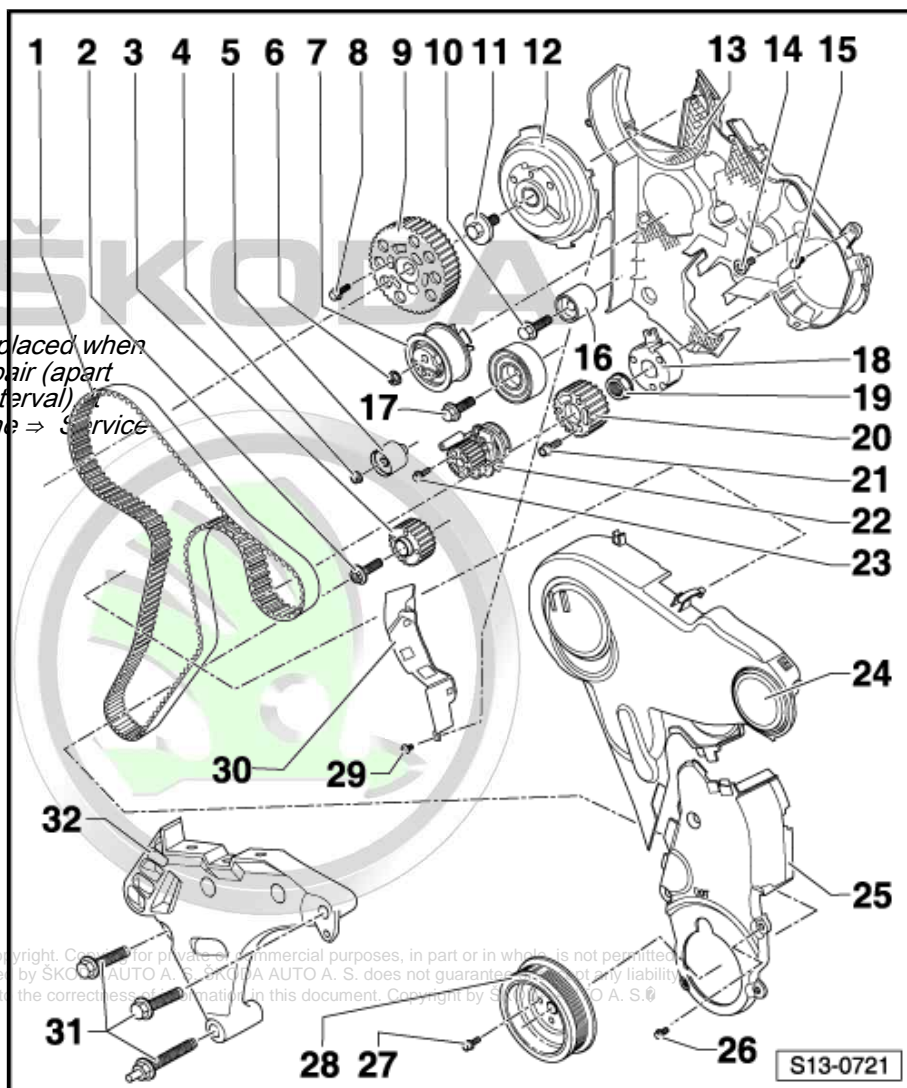
12 - Hub

- ☐ for camshaft
- ☐ to remove use extractor -T10052-
- ☐ removing and installing ⇒ [page 85](#)

13 - Rear toothed belt guard

14 - 20 Nm + torque a further 45° (1/8 turn)

- ☐ replace
- ☐ Attach high pressure pump





15 - 9 - 12 Nm

- ☐ replace

16 - Guide pulley

- ☐ for toothed belt

17 - 50 Nm + torque a further 90° (1/4 turn)

- ☐ replace

18 - Hub

- ☐ for high pressure pump
- ☐ to release and tighten use counterholder -T10051-
- ☐ to remove use extractor -T40064-
- ☐ removing and installing ⇒ [page 187](#)

19 - 95 Nm

20 - Toothed belt gear

- ☐ on the high pressure pump

21 - 20 Nm + torque a further 90° (1/4 turn)

- ☐ replace

22 - Coolant pump

- ☐ removing and installing ⇒ [page 121](#)

23 - 15 Nm

24 - Timing belt guard - top part

25 - Timing belt guard - bottom part

- ☐ removing and installing ⇒ [page 33](#)

26 - 9 Nm

- ☐ apply locking agent -D 000 600 A2- before installing

27 - 10 Nm + torque a further 90° (1/4 turn)

- ☐ replace

28 - Crankshaft-belt pulley

- ☐ with vibration damper

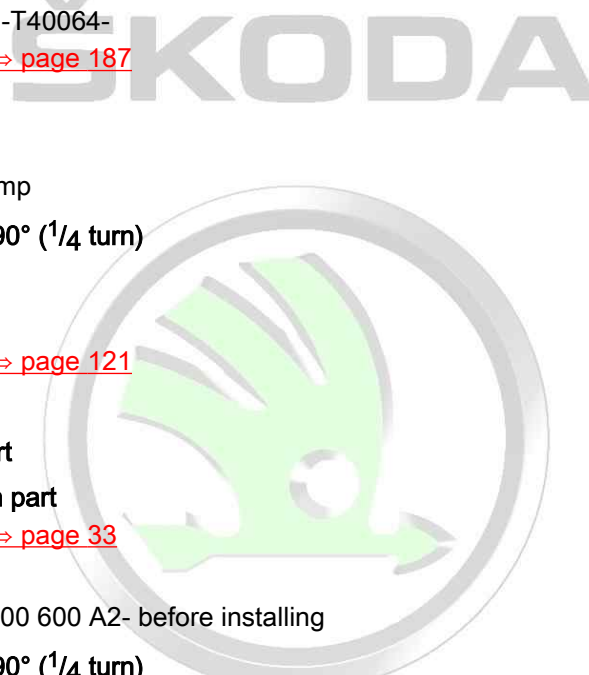
29 - 5 Nm

30 - Protection plate

31 - 40 Nm + torque a further 180° (1/2 turn)

- ☐ replace
- ☐ observe the order of tightening up ⇒ [page 33](#)

32 - Engine support bracket



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Secure the engine support

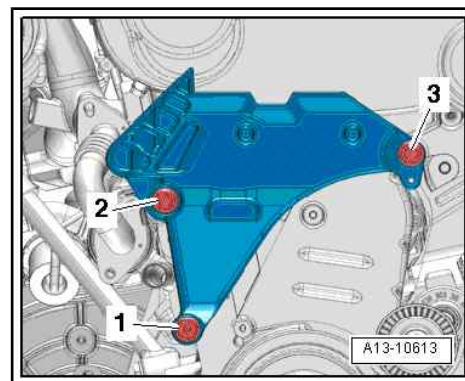


Note

Replace screws for engine support.

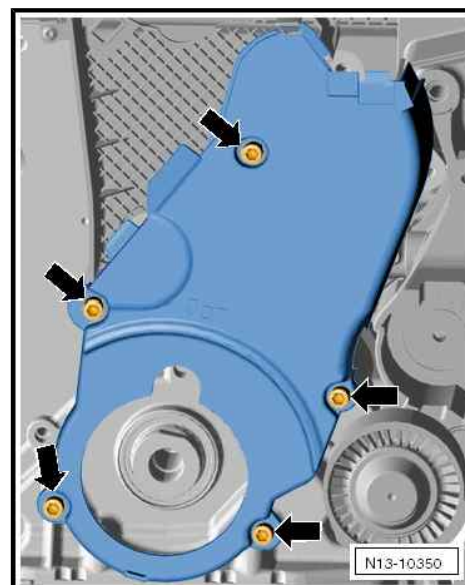
- Tighten screws in 3 stages in the following sequence:

Stage	Tightening order	Torque/torquing angle
1.	-2, 1, 3-	7 Nm
2.	-2, 1, 3-	40 Nm
3.	-2, 1, 3-	180° (1/2 turn)



Attach toothed belt guard - bottom part

- Insert screws with locking agent -D 000 600 A2- .
- Tighten screws -arrows- to 9 Nm ⇒ [Item 26 \(page 32\)](#) .



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1.7 Removing and installing toothed belt

Special tools and workshop equipment required

- ◆ Rig pin for diesel injection pump -3359- (2x)
- ◆ Crankshaft arrester -T10050-
- ◆ Locking pin -T10060 A-
- ◆ Counterholder -T10172 - with bolts -T10172/4- and bolts -T10172/9-
- ◆ Offset screwdriver -T10264-
- ◆ Rig tool -T10265 -
- ◆ Socket insert -T10385-
- ◆ Pliers for spring strap clamps



1.7.1 Removing



Caution

When undertaking all installation work, particularly in the engine compartment because of its cramped construction, please observe the following:

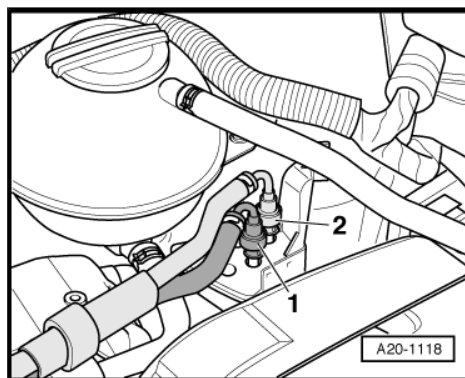
- ◆ *If the toothed belt is replaced when carrying out engine repair (apart from regular change interval), it should be entered in the ⇒ Service Schedule !*
- ◆ *Lay lines of all kinds (e.g. for fuel, hydraulic fluid, cooling fluid and refrigerant, brake fluid, vacuum) and electrical lines in such a way that the original line guide is re-established.*
- ◆ *In order to avoid damage to the cables, ensure that there is adequate free access to all moving or hot components.*



Note

- ◆ *Observe safety measures when working on the fuel system ⇒ [page 3](#) .*
- ◆ *Observe rules for cleanliness ⇒ [page 4](#) .*
- ◆ *The engine support does not have to be removed in order to remove the camshaft sprocket.*
- ◆ *For vehicles with auxiliary heating, the plug connection for the dosing pump -V54- must be disconnected additionally.*
- Put the shift lever into Neutral or the selector lever into position „N“ in order to turn the crankshaft.
- Switch off ignition and withdraw ignition key.
- Remove engine cover ⇒ [page 7](#) .
- Remove noise insulation ⇒ Body Work ⇒ Rep. gr. 66.
- Detach fuel feed line -2- and fuel return-flow line -1-, to do so press in securing ring.

Vehicles with engine identification characters CFHC, CFHF



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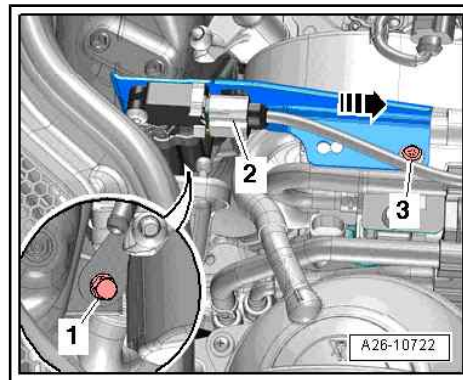
- Disconnect plug -2- at differential pressure indicator -G505- .
- Screw out screw -3- and remove bracket with differential pressure indicator -G505- from the bracket of the additional fuel pump in -direction of arrow-.
- Place the bracket with the differential pressure indicator - G505- to the rear.



Caution

Risk of damage!

- ◆ *The differential pressure indicator -G505- is very sensitive and must not touch somewhere when laying it down with the bracket.*



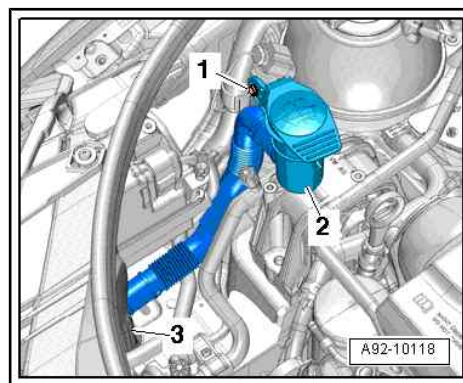
Continued for all vehicles

- Unscrew bolt -1-.
- Push the filler tube with the filler neck -2- for the washer-fluid reservoir to the side.

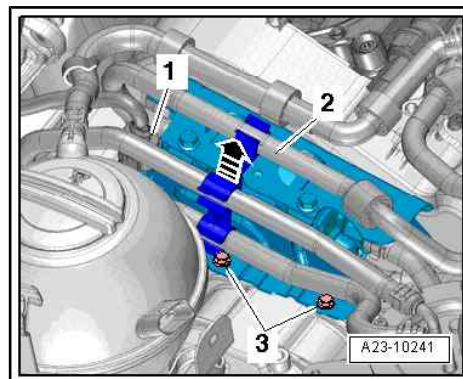


Note

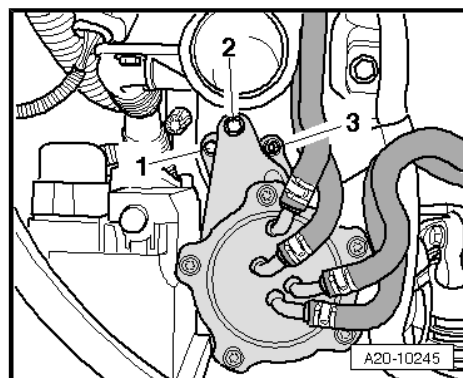
For reasons of clarity the fuel filter is not shown.



- Unhook the fuel hose -2- from the bracket.
- Remove the bracket for the fuel lines upwards in -direction of arrow- and place it to the side.
- Disconnect plug -1- from the additional fuel pump -V393- .
- Unscrew bolts -3-.



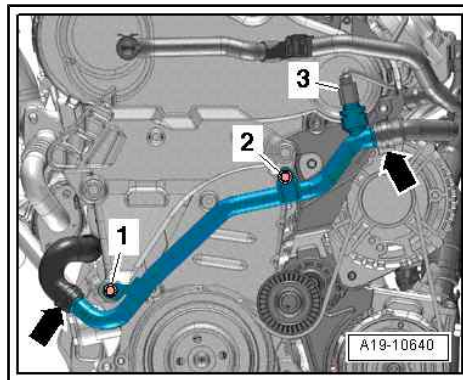
- Loosen screw -1- by 2 turns.
- Release screw -2- and nut -3-.
- Unclip bracket for coolant line at fuel filter.
- Lay the compensation bottle with the hoses connected and the fuel filter with the hoses connected onto the engine.



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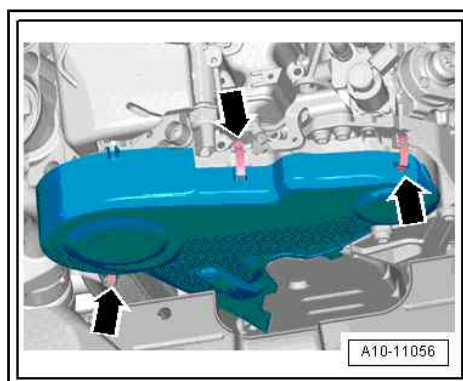
- Disconnect plug -3- at the coolant temperature sender at radiator outlet -G83- .
- Release nut -1- and screw -2-.
- Press the right coolant pipe with the hoses connected -arrows- to the side.



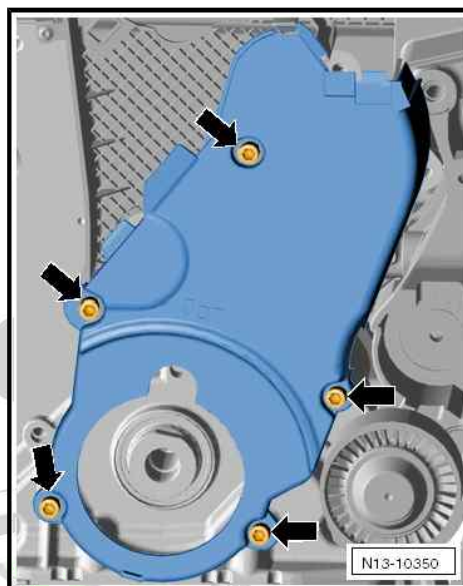
- Remove top part of toothed belt guard; to do so release retaining clips -arrows-.
- Remove crankshaft belt pulley.

**Note**

Do not lock tensioning element for V-ribbed belt.



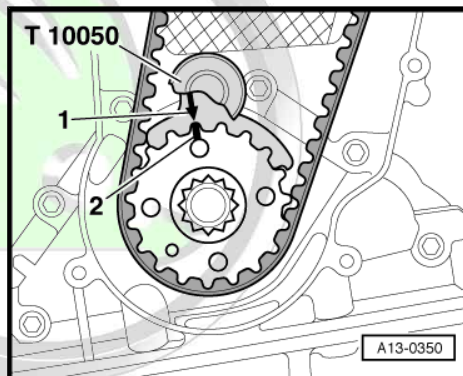
- Release screws -arrows-.
- Remove bottom part of toothed belt guard.



- Rotate the crankshaft in direction of rotation of engine at top dead centre and remove the crankshaft toothed belt sprocket with the crankshaft arrester -T10050- . To do so, slide the crankshaft arrester from the front side of the timing belt sprocket into its teeth.

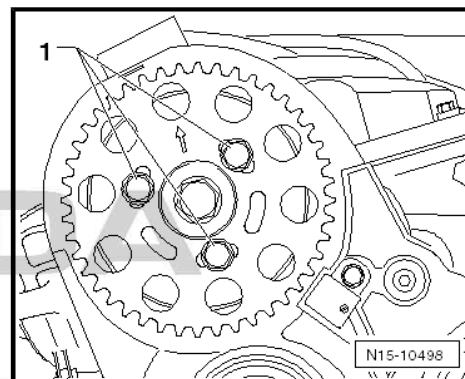
**Note**

The markings on the crankshaft timing belt sprocket -2- and the crankshaft arrester -T10050- -1- must be positioned opposite each other. While doing so, the stud of the crankshaft arrester -T10050- must engage in the hole of the sealing flange.

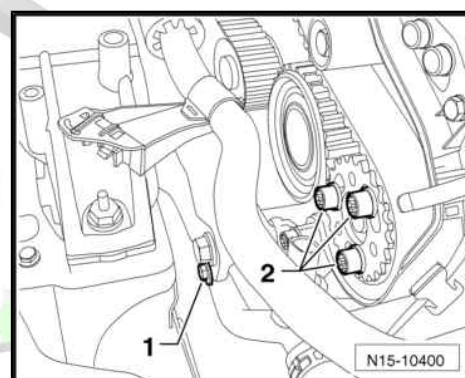


While doing so, the arrow on the camshaft sprocket must be close to the »12 o'clock« position.

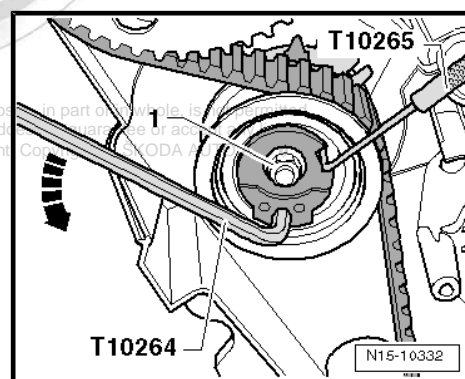
- Successively release the screws -1- of the camshaft sprocket, replace these screws and do not fully screw in the new screws by hand.



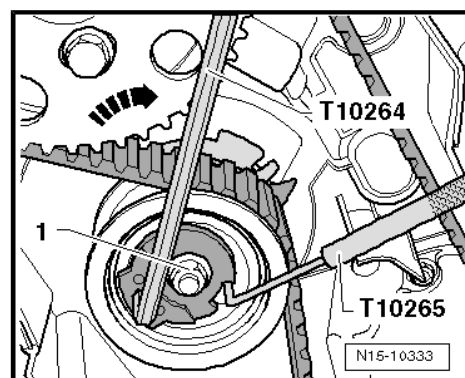
- Successively release the screws -2- of the toothed belt sprocket at the high pressure pump, replace these screws and do not fully screw in the new screws.



- Loosen nut -1- for tensioning pulley.
- Turn the eccentric of the tensioning pulley with the offset screwdriver -T10264- in -direction of arrow- (anti-clockwise) until the tensioning pulley can be interlocked with the rig tool -T10265-.



- Afterwards, turn the eccentric of the tensioning pulley with the offset screwdriver -T10264- in -direction of arrow- up to the stop and tighten nut -1- by hand.



Caution

Risk of damage through reversing the rotation direction of an already used toothed belt.

- ◆ ***If the toothed belt is re-installed, mark the direction of rotation with chalk or a felt-tip pen before removing it.***

- First of all remove the toothed belt from the large guide pulley and then from the remaining toothed belt gears.



1.7.2 Installing (set the timing)

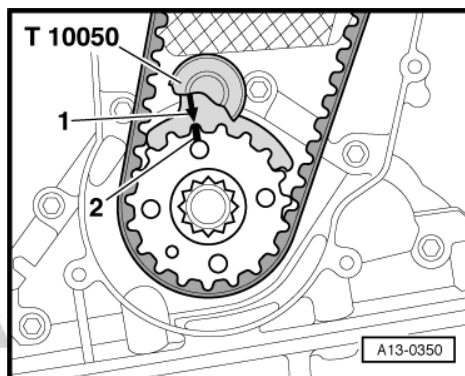
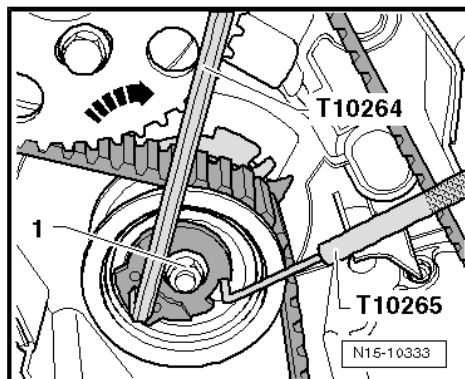


Note

- ♦ *Adjusting work on the timing belt must only be performed on a cold engine, as the position of the pointer at the tensioning element is temperature dependent.*
- ♦ *If it is intended to replace the tensioning pulley, the engine support must be removed.*

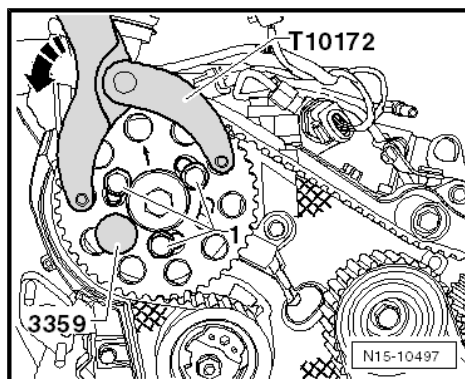
Conditions

- Tensioning pulley locked with rig tool -T10265- and fixed with nut up to right stop.
- Lock the crankshaft with the crankshaft arrester -T10050- .
- The screws for the camshaft sprocket and the toothed belt gear on the high pressure pump are replaced and loosely tightened. It must still be possible to just turn the timing belt gears, however they must not tilt.

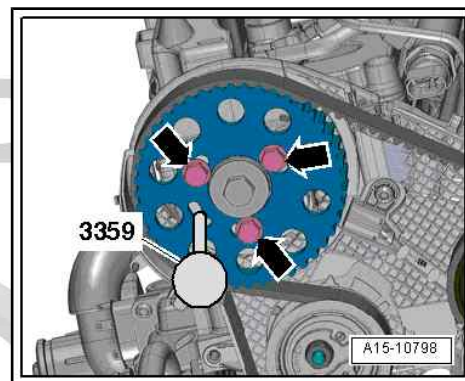


Note

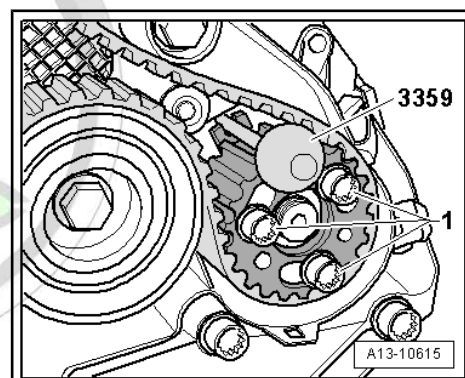
If necessary, turn the hub of the camshaft using the counterholder -T10172- with adapters -T10172/4- until it can be locked. To do so tighten at least one fixing screw -1- by hand.



- Lock the hub of the camshaft with the rig pin for injection pump -3359-. To do so, insert rig pin through the open elongated hole in the cylinder head bore.
- Loosen again the screws which were tightened by hand.



- Lock the hub of the high pressure pump with the rig pin for injection pump -3359-. To do so, insert the rig pin into the hole of the timing belt gear from the outside.

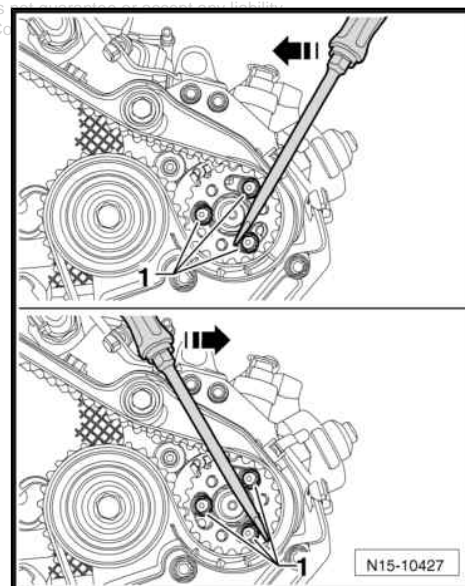


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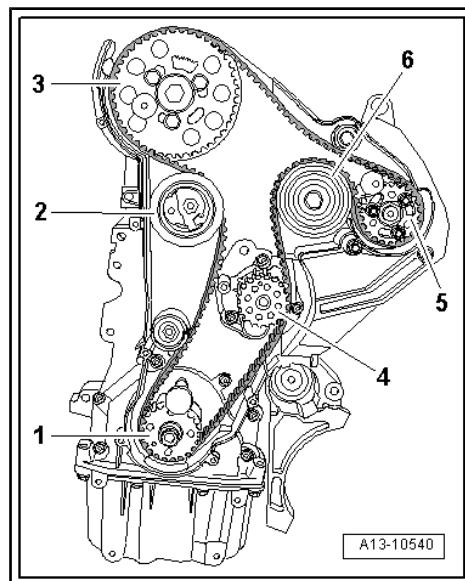
Note

If necessary, use a screwdriver to turn the hub of the high pressure pump at the screw heads -1- until the hub can be locked with the rig pin.

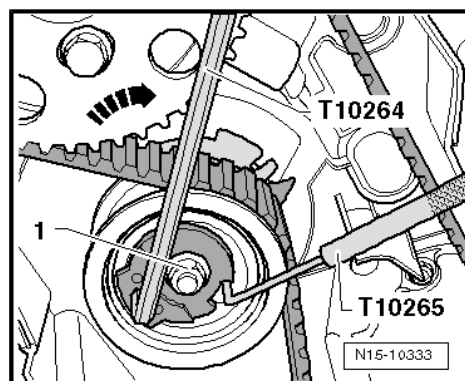




- Turn the camshaft sprocket -3- and the toothed belt sprocket on the high pressure pump -5- clockwise in their elongated holes as far as the stop.
- Fit the toothed belt in the following order:
 - 1 - Crankshaft - toothed belt sprocket
 - 2 - Tensioning pulley
 - 3 - Camshaft sprocket
 - 4 - Timing belt gear on the coolant pump
 - 5 - Toothed belt gear on the high pressure pump
 - 6 - Guide pulley

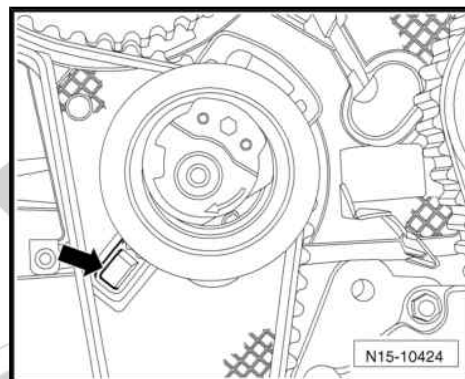


- Loosen nut -1- for tensioning pulley and remove rig tool - T10265- .



Note

Pay attention to correct fitting of the tensioning pulley in the rear timing belt cover -arrow-.

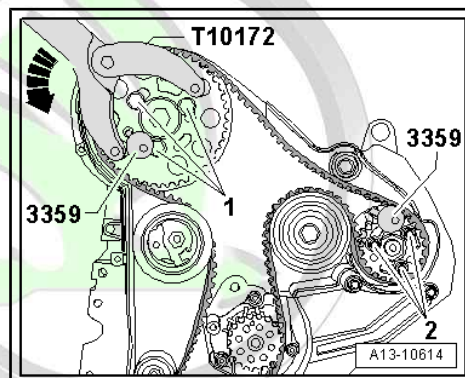


- Fit counterholder -T10172- with adapters -T10172/4 - onto camshaft sprocket.
- Push the counterholder in -direction of arrow- and keep it pre-tensioned.
- First of all tighten the screws -1- for the camshaft sprocket and the screws -2- for the toothed belt gear on the high pressure pump in this position to 20 Nm.



Note

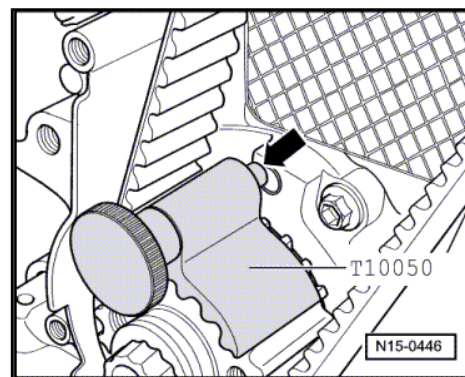
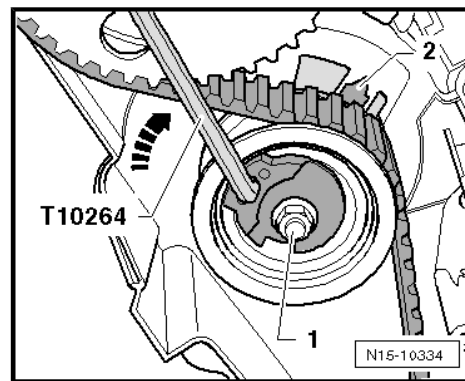
The screws must be further turned after the setting and testing of the timing have been carried out ➔ [page 43](#) .



- Turn the eccentric of the tensioning pulley with the offset screwdriver -T10264- clockwise -arrow- until the pointer -2- is in the centre of the base plate in front of the gap.
- The nut -1- must not turn along.
- Hold tensioning pulley in this position and tighten nut.
Tightening torque: 20 Nm + torque a further 45° (1/8 turn)
- Remove locking pins -3359- and the crankshaft arrester - T10050- .

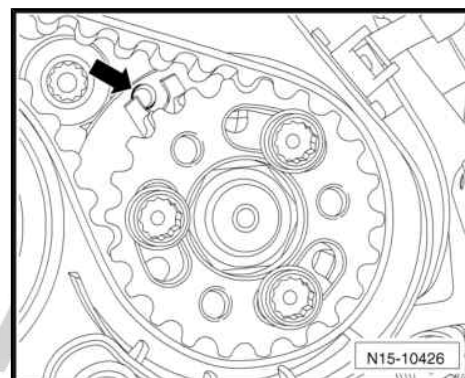
Test timing

- Turn the crankshaft at the central screw for the crankshaft toothed belt sprocket 2 turns in the direction of rotation of the engine until the crankshaft is positioned shortly before „TDC“.
- Position the crankshaft arrester -T10050- on the crankshaft toothed belt sprocket.
- Turn the crankshaft in the direction of rotation of the engine until the bolt -arrow- of the crankshaft arrester engages during this rotary movement into the hole in the sealing flange.



Note

The removal of the crankshaft and camshaft is limited in the following test. The removal point of the hub of the high pressure pump is always difficult to find again. A slight difference -arrow- does not influence the engine running.



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Conditions

- The hub of the camshaft must be locked with the rig pin for injection pump -3359- .
- The pointer of the tensioning pulley -2- must be in the area -a- of the base plate -1-.

If the conditions are not fulfilled:

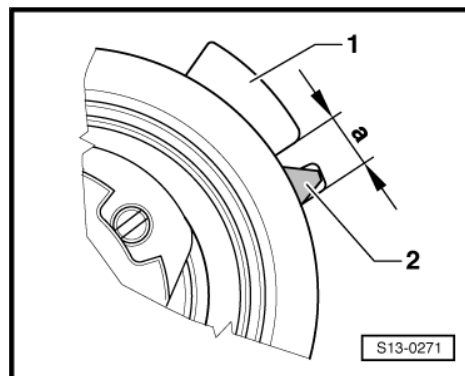
- Correct timing ⇒ [page 42](#) .

If the conditions are fulfilled:

- Continued if the timing is correctly set ⇒ [page 43](#) .

Correct timing

- Push the crankshaft arrester -T10050- until its locking bolt pushes out of the hole in the sealing flange.
- Turn the crankshaft against the running direction of the engine slightly before the „TDC“.
- Now slowly turn with the crankshaft in the running direction of the engine, until the hub of the camshaft can be locked during this rotary movement with the rig pin for the injection pump -3359- .
- Slacken the fixing screws for the camshaft sprocket on the locked hub of the camshaft sprocket.
- Check the position of the bolt of the crankshaft arrester -T10050- to the hole in the sealing flange:



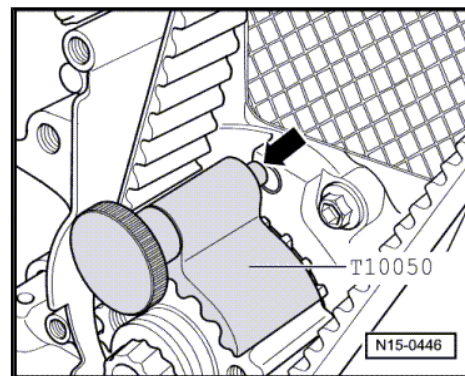
If the bolt of the crankshaft arrester -T10050- is positioned to the left of the hole:

- Slowly turn the crankshaft in the direction of rotation of the engine until the bolt of the crankshaft arrester -T10050- engages into the hole in the sealing flange.
- First tighten the fixing screws for the camshaft sprocket to 20 Nm.



Note

The screws must be further turned according to the setting of the timing ➔ [page 43](#) .



If the bolt of the crankshaft arrester -T10050- is positioned to the right behind the hole:

- First of all turn the crankshaft slightly against the direction of rotation of engine until the bolt is positioned to the left in front of the hole.
- Slowly turn the crankshaft in the direction of rotation of the engine until the bolt of the crankshaft arrester -T10050- engages into the hole in the sealing flange.
- First tighten the fixing screws for the camshaft sprocket to 20 Nm.



Note

The screws must be further turned according to the setting of the timing ➔ [page 43](#) .

Continued if the timing is correctly set

- Remove the locking pin -3359- and the crankshaft arrester -T10050- .
- Once again test timing ➔ [page 41](#) .

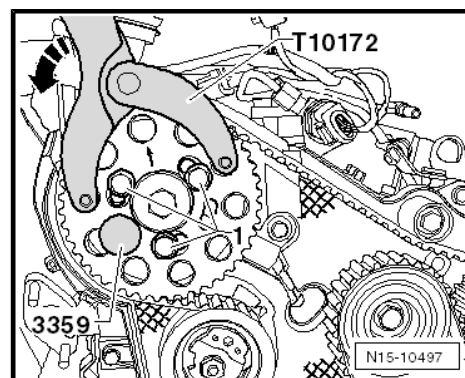
If the hub of the camshaft sprocket can now be removed:

- Tighten the fixing screws of the toothed belt sprockets with a rigid wrench as follows:

◆ Camshaft sprocket:

- 45° (torque a further 45° (1/8 turn). Counterhold counterholder -T10172- with adapters -T10172/4- .

◆ Toothed belt sprocket on the high pressure pump:

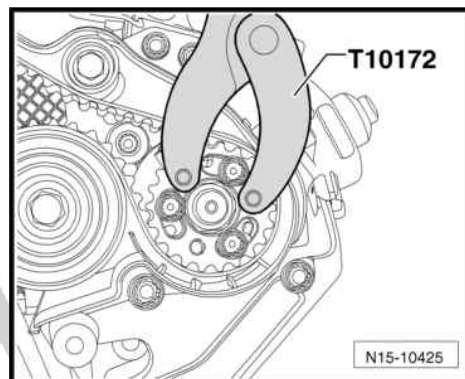




- 90° (torque a further 45° ($\frac{1}{4}$ turn). Counterhold counterholder -T10172- with adapters -T10172/9- .

Further installation occurs in reverse order to removal.

Tightening torques: ➔ [page 30](#)



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2 Removing and installing sealing flange and two-mass flywheel



Note

Repairs to the clutch ⇒ gearbox ⇒ Rep. gr. 30.

1 - Sealing ring

- ☐ replace ⇒ [page 46](#)
- ☐ do not oil or grease

2 - Sealing flange

- ☐ on belt pulley side
- ☐ must be positioned on dowel sleeves
- ☐ removing and installing ⇒ [page 47](#)

3 - Cylinder block

4 - The two-mass flywheel

- ☐ removing and installing ⇒ [page 55](#)
- ☐ assembly is only possible in one position through offset holes

5 - 60 Nm + torque a further 90° (1/4 turn)

- ☐ replace

6 - Intermediate plate

- ☐ must be positioned on dowel sleeves
- ☐ do not damage/bend during assembly work
- ☐ hang on the sealing flange ⇒ [page 46](#)

7 - 15 Nm

- ☐ replace

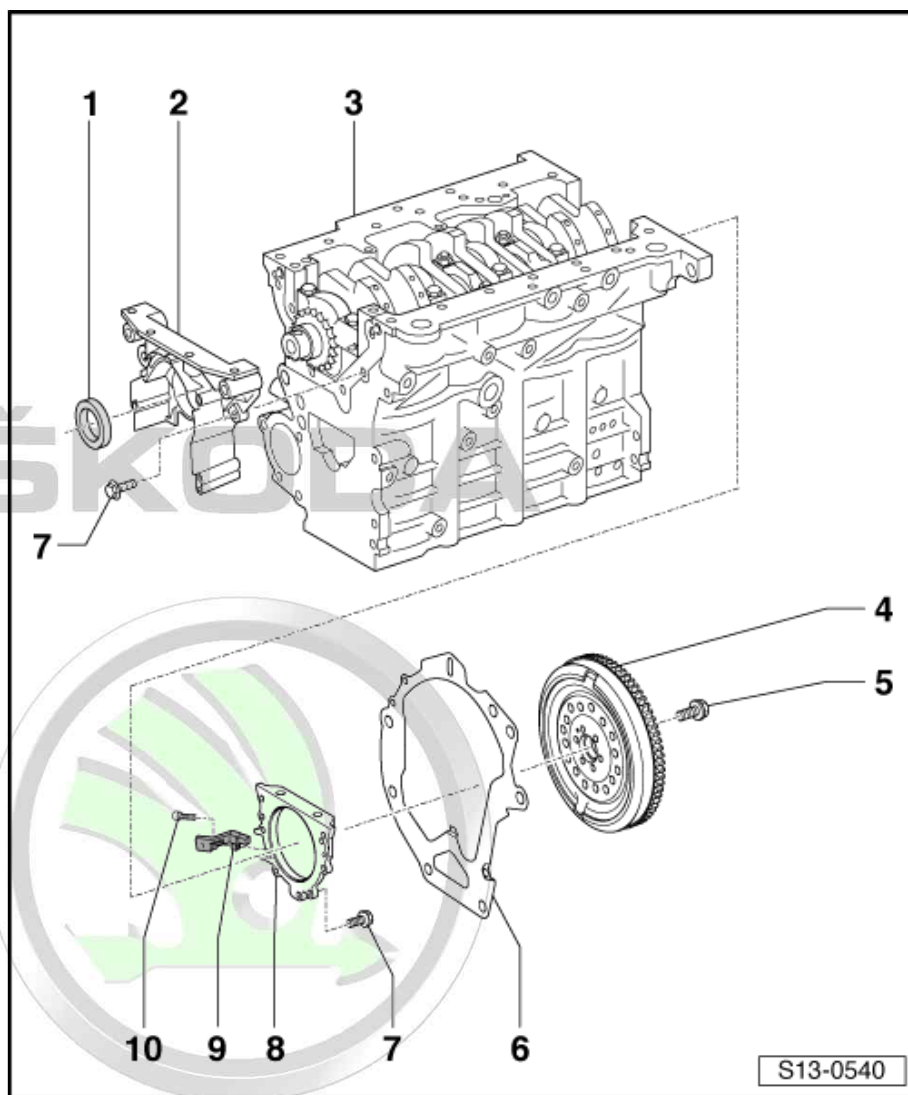
8 - Sealing flange

- ☐ on gearbox side
- ☐ can only be replaced complete with gasket ring and with rotor of engine speed sender -G28-
- ☐ replace ⇒ [page 49](#)

9 - Engine speed sender -G28-

- ☐ removing and installing ⇒ [page 184](#)

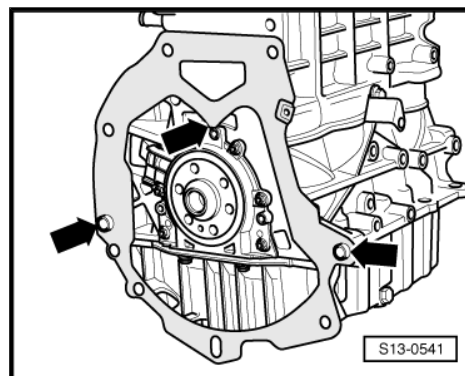
10 - 5 Nm





Installing intermediate plate

- Insert intermediate plate on sealing flange -top arrow- and push onto the dowel sleeves -side arrows-.



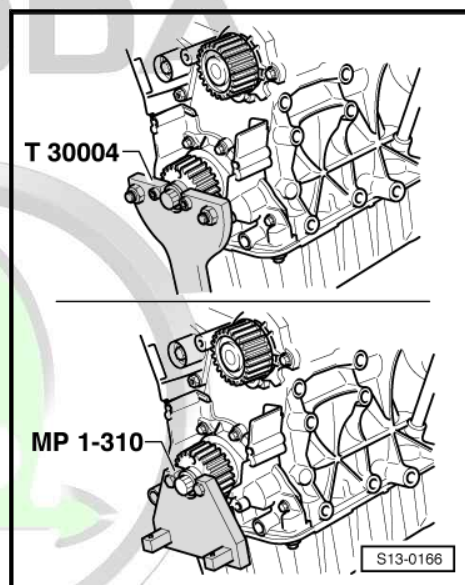
2.1 Replacing crankshaft seal on belt pulley side

Special tools and workshop equipment required

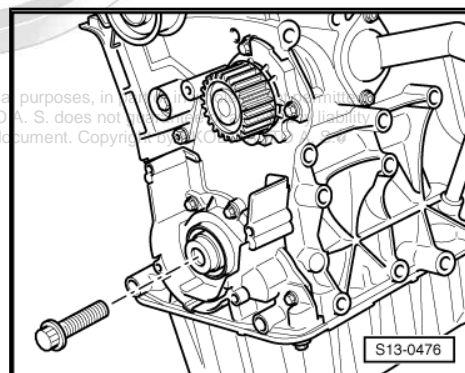
- ◆ Counterholder -T30004 (3415)- or Counterholder -MP1-310 (3099)-
- ◆ Gasket ring extractor -MP1-226 (3203)-
- ◆ Assembly device -T10053-

Removing

- Engine installed.
- Removing toothed belt ⇒ [page 33](#) .
- Remove crankshaft - toothed belt sprocket, to this end lock toothed belt sprocket with counterholder -T30004- or counterholder -MP1-310- .



- To guide the gasket ring extractor -MP1-226- screw the central screw for the crankshaft toothed belt sprocket fully into the crankshaft by hand.



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- Turn inner part of gasket ring extractor -MP1-226- two turns (approx. 3 mm) out of the outer part and secure with knurled screw.
- Oil the thread head of the gasket ring extractor, position and forcibly screw into the gasket ring as far as possible.
- Release knurled screw and turn the inner side against the crankshaft until the gasket ring is pulled out.
- Clamp gasket ring extractor into the vice and remove gasket ring with pliers.
- Clean the contact and sealing surfaces.

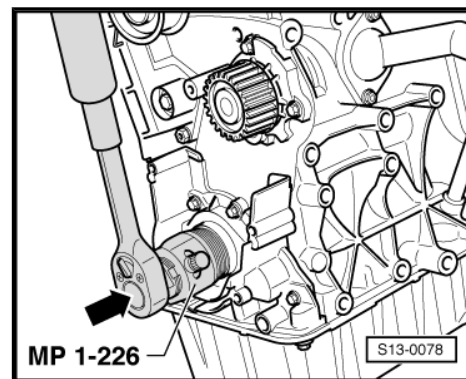
Install



Note

Do not oil the sealing lip and the outer surface of the new gasket ring before the pressing in procedure.

- Remove oil residue on the crankshaft journal with a clean cloth.
- Insert guide bushing -T10053/1- on the crankshaft journal.
- Slide gasket ring over the guide bushing.



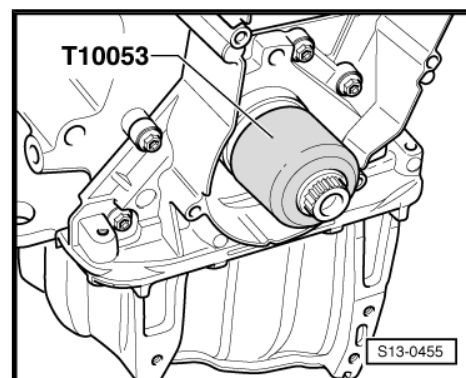
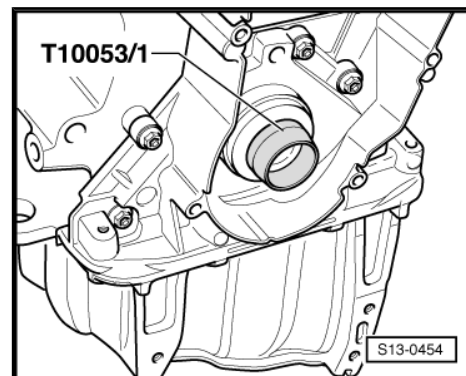
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- Press in the gasket ring flush with the central screw for the crankshaft toothed belt sprocket and with the pressure bushing of the assembly device -T10053-.



Note

- ◆ *There must not be any oil present on the contact surface between toothed belt sprocket and crankshaft.*
- ◆ *Replace central screw for crankshaft toothed belt sprocket.*
- ◆ *Do not oil central screw for crankshaft toothed belt sprocket.*
- ◆ *Tighten central screw ➔ [page 30](#).*



- Install crankshaft - toothed belt sprocket, to this end lock toothed belt sprocket with counterholder.

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- Installing the timing belt ➔ [page 38](#).

2.2 Removing and installing the sealing flange on the belt pulley side

Special tools and workshop equipment required

- ◆ Counterholder -T30004 (3415)- or Counterholder -MP1-310 (3099)-



- ◆ Assembly device -T10053-
- ◆ Protective goggles and gloves
- ◆ Sealant remover gasket stripper (bearing code GST, bearing article no. R 34402), manufacturer Retech s.r.o.
- ◆ Cleaning and degreasing agent , e.g. -D 000 401 04-
- ◆ Silicone sealant -D 176 404 A2-

Removing

- Engine installed.
- Removing toothed belt ⇒ [page 33](#) .
- Remove crankshaft - toothed belt sprocket, to this end lock toothed belt sprocket with counterholder -T30004- or counterholder -MP1-310- .
- Drain engine oil ⇒ Maintenance ; Booklet Octavia II .
- Removing the oil pan ⇒ [page 103](#) .
- Unscrew the fixing screws of the sealing flange on the belt pulley side and remove sealing flange, if necessary release by applying slight blows with a rubber-headed hammer.
- Drive out the gasket ring from the removed sealing flange.

Install

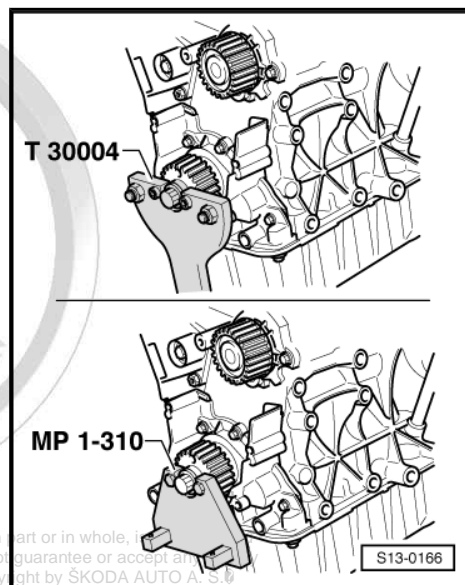
Installation is performed in the reverse order, pay attention to the following points:



WARNING

Wear protective gloves and goggles when working with gasket remover and degreasing agent!

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- Remove residual sealant from the sealing surfaces on sealing flange, cylinder block and on the oil pan with chemical sealant remover.
- Degrease the sealing surfaces.



Note

Pay attention to the use by date on the silicone sealant.

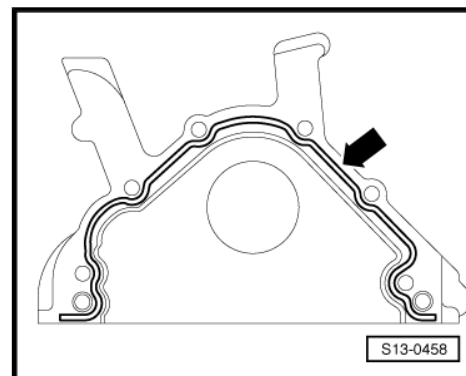
- Cut off nozzle tube at the front marking (\varnothing of nozzle approx. 3 mm).

- Apply silicone sealant bead -arrow- to the clean sealing surface of the upper part of the sealing flange, as shown.
- Thickness of sealant bead -arrow-: 2...3 mm



Note

- ◆ *The sealant bead must not be thicker than 3 mm otherwise excess sealant may get into the oil pan and clog the strainer in the intake manifold of the oil pump.*
- ◆ *The sealing flange must be installed within 5 minutes after applying the silicone sealant.*
- ◆ *When installing the sealing flange with the gasket ring fitted place a guide sleeve -T10053/1- on the crankshaft journal.*
- Carefully push the sealing flange onto the dowel sleeves at the cylinder block and tighten new fixing bolts by hand.
- Tighten the screws of the sealing flange alternately and cross-wise to 15 Nm.
- Installing the oil pan ➔ [page 103](#).
- Install the new gasket ring for the crankshaft on the belt pulley side ➔ [page 46](#).
- Installing the timing belt ➔ [page 38](#).
- Top up with engine oil and check the oil level ➔ Maintenance ; Booklet Octavia II .



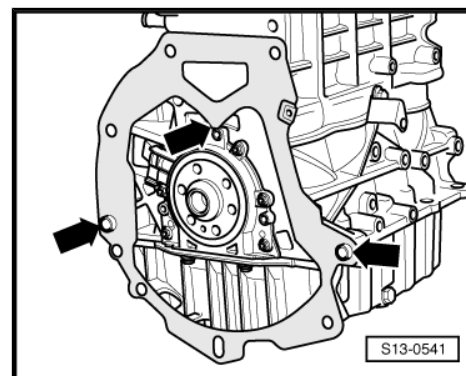
2.3 Replace sealing flange on the gearbox side

Special tools and workshop equipment required

- ◆ Assembly tool -T10134-
- ◆ Feeler gauge
- ◆ Steel straightedge
- ◆ Screw M6 x 35 (3x)
- ◆ Screw M7 x 35 (2x)

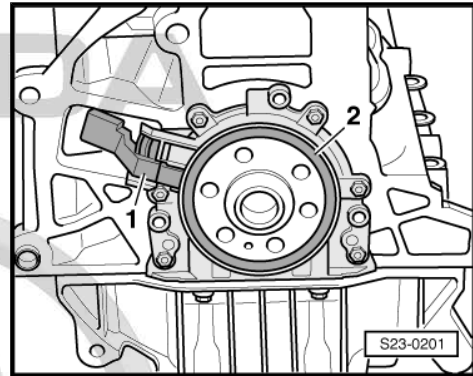
2.3.1 Removing

- Gearbox is removed.
- Remove the two-mass flywheel ➔ [page 55](#).
- Remove the intermediate plate from the dowel sleeves and unhook from sealing flange -arrows-.
- Position crankshaft to TDC for cylinder 1 ➔ [page 33](#).
- Removing the oil pan ➔ [page 103](#).

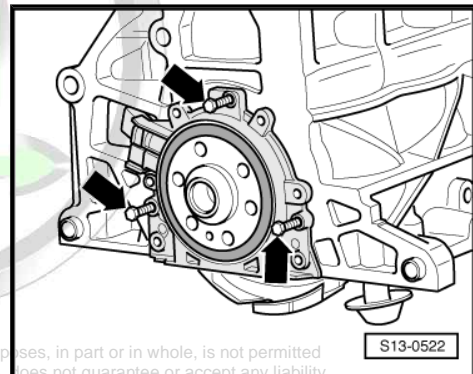




- Remove engine speed sender -G28- -1-.
- Unscrew the fixing screws of the sealing flange.



- Screw 3 screws M6 x 35 mm into the threaded bores of the sealing flange -arrows-.
- Remove the sealing flange together with rotor from the crankshaft by alternately screwing in the press-off screws.



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2.3.2 Install

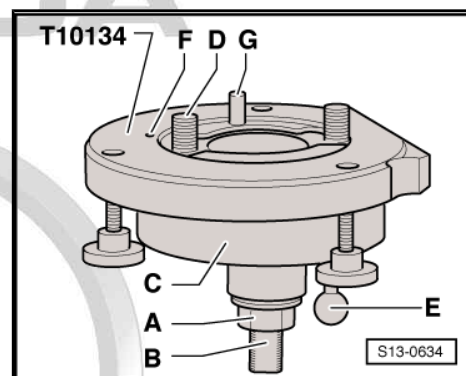


Note

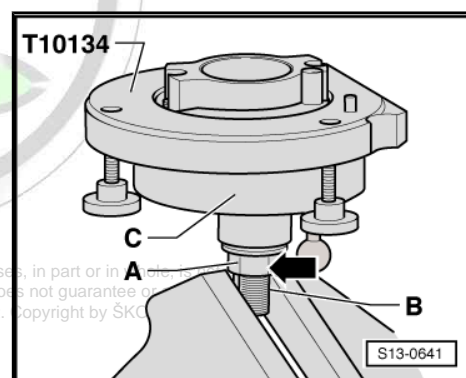
- ◆ The sealing flange with PTFE gasket ring is provided with sealing lip supporting ring. This supporting ring is intended as an assembly sleeve and must not be removed before installing.
- ◆ Do not separate or turn the sealing flange and rotor after removing them from the spare part package.
- ◆ The rotor is given its fitting location by fixing the assembly tool -T10134- to the positioning pin.
- ◆ The sealing flange and gasket ring form one unit and must be replaced together with the rotor.
- ◆ The rotor has an elastomer layer on its sealing surface with the crankshaft. This layer must not be brought into contact with dirt or grease.
- ◆ The assembly tool -T10134- is given its fitting location to the crankshaft by means of a guide bolt, which is guided into the threaded bore of the crankshaft.

A - Mounting sealing flange with rotor on the assembly tool - T10134-

- A - Hexagon nut
- B - Clamping surface
- C - Assembly cup
- D - Allan screw
- E - Guide bolts for petrol engine - with red handle
- F - Positioning pin
- G - Guide bolts for diesel engine - with black handle



- Grip the assembly tool -T10134- on the clamping surface -B- of the threaded spindle in a vice.
- Push assembly cup -C- down so that it rests on the hexagon nut -A- -arrow-.
- The inner part of the assembly tool and the assembly cup must be flush.

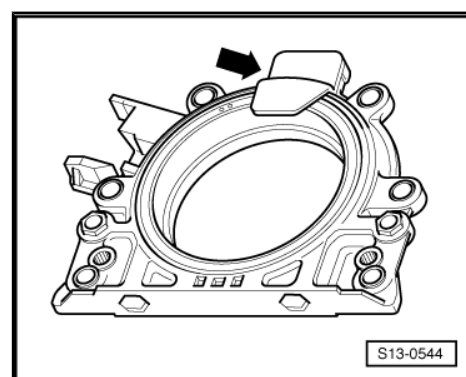


- Remove the securing clip -arrow- from the new sealing flange.



Note

Do not remove or turn the rotor from the sealing flange.

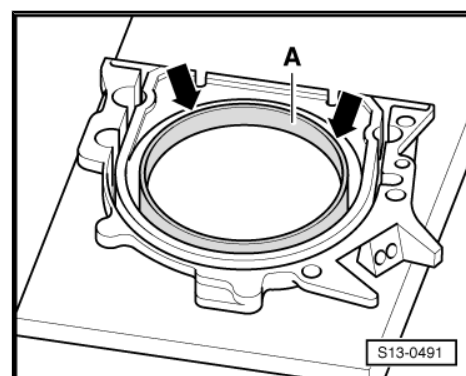


- Lay the front side of the sealing flange on a clean and level surface.
- Press down sealing lips supporting ring -A- in -direction of the arrow-, until it rests on the level surface.



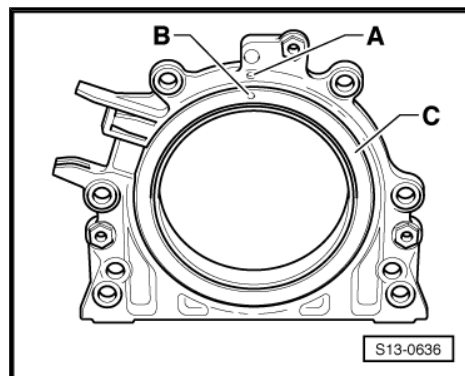
Note

The top edge of the rotor and the front edge of the sealing flange must be flush.





The locating hole -B- on the rotor -C- must be flush with the marking -A- on the sealing flange.

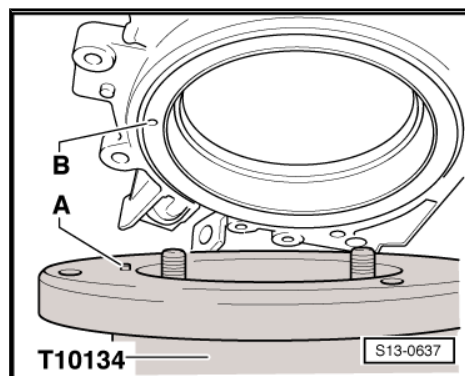


- Lay the sealing flange with the front side on the assembly tool -T10134- in such a way that the positioning pin -A- engages into the hole -B- of the rotor.



Note

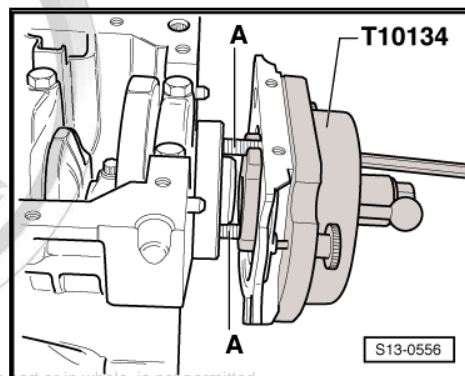
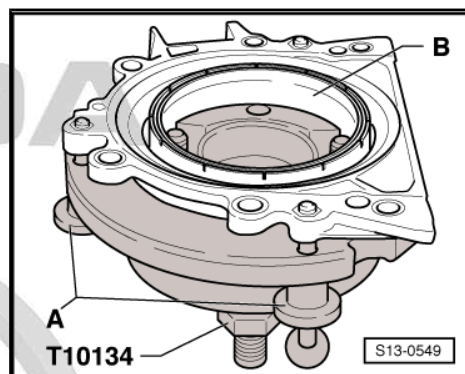
Make sure the sealing flange lies flat on the assembly tool.



- When tightening the knurled screws -A- press the sealing lip supporting ring -B- on the surface of the assembly tool -T10134- in such a way that the positioning pin can no longer slide out of the rotor hole.

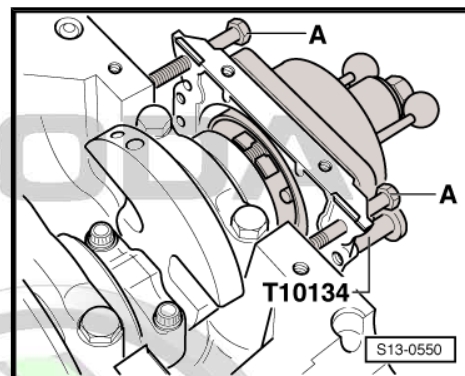
B - Mounting the assembly tool -T10134- with sealing flange on the crankshaft flange

- The crankshaft flange must be free of grease and oil
- Crankshaft is at TDC for cylinder 1
- Unscrew hexagon nut up to the end of the threaded spindle.
- Screw assembly tool -T10134- with Allan screws -A- up to the stop onto the crankshaft flange.

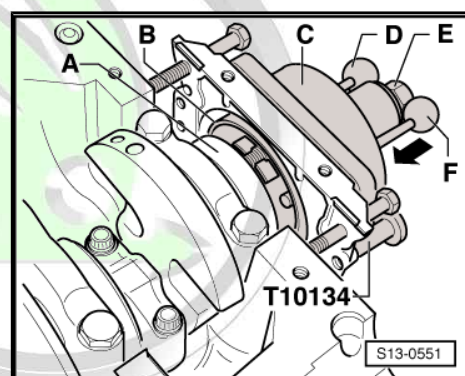


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- Screw in two screws M7 x 35 mm -A- by about 3 thread turns for the sealing flange guide into the cylinder block.



- Move the assembly cup -C- by hand in the -direction of the arrow- until the rotor -B- rests on the crankshaft flange -A-. Subsequently insert the guide bolt for diesel engines with black handle -D- fully into the threaded bore of the crankshaft. If the guide bolt is correctly positioned, then the handle has a distance of approx. 10 mm from the assembly cup -C-. This gives the rotor its final fitting location.



- Screw in hexagon nut -E- by hand onto the threaded spindle until it rests against the assembly cup -C-.



Note

The guide bolt for petrol engines (red handle) -F- must not be fitted into the threaded hole of the crankshaft.

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C - Pressing the rotor onto the crankshaft flange

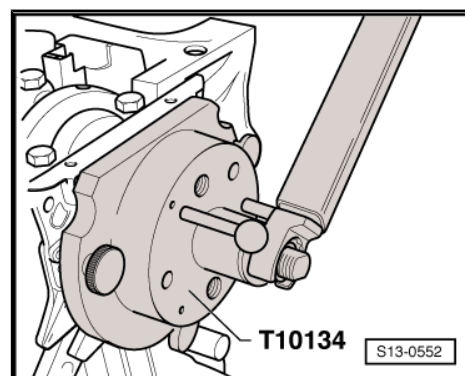
- Tighten the hexagon nut of the assembly tool -T10134- using a torque wrench with adapter.

Tightening torque: 35 Nm



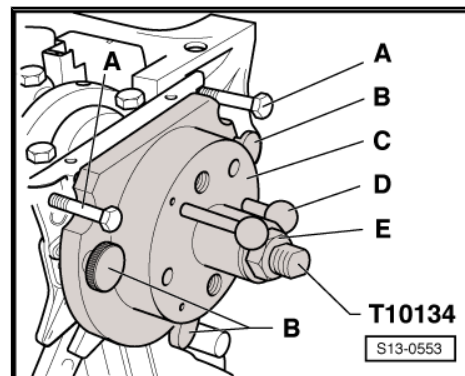
Note

After tightening the nut to 35 mm there must still be a narrow air gap between the cylinder block and the sealing flange.



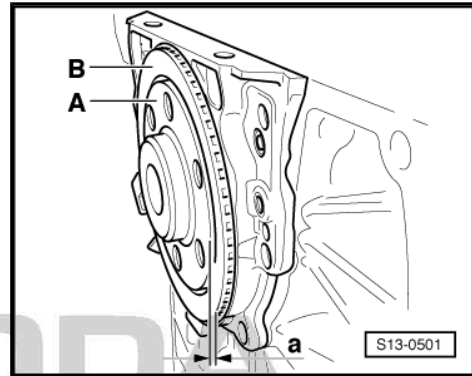
D - Inspecting the fitting position of the rotor on the crankshaft

- Unscrew hexagon nut -E- up to the end of the threaded spindle.
- Release both screws -A- to the guide from the cylinder block.
- Unscrew three knurled screws -B- from the sealing flange.
- Unscrew two Allan screws and remove assembly tool.
- Remove sealing lips supporting ring.





The fitting position of the rotor on the crankshaft is accurate if there is a distance -a- of 0.5 mm between the crankshaft flange -A- and the rotor -B-.



- Position the steel straightedge onto the crankshaft flange.
- Measure the distance between the steel straightedge and the rotor with a feeler gauge.

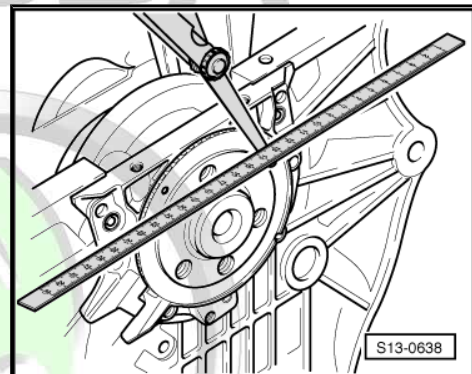
If the measured distance is less than 0.5 mm:

- Press down rotor ➔ [page 54](#) .

If the dimension is correct:

- Tighten the new fixing screws of the sealing alternately cross-wise.

Tightening torque: 15 Nm



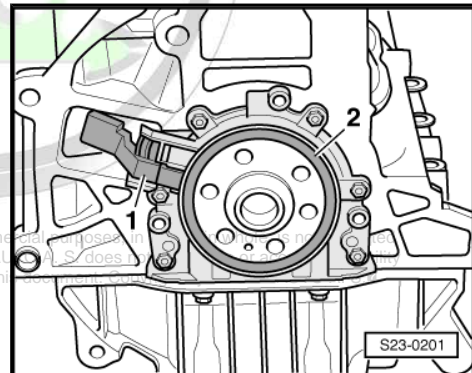
- Install engine speed sender -G28- -1-.

Tightening torque: 5 Nm

- Installing the oil pan ➔ [page 103](#) .

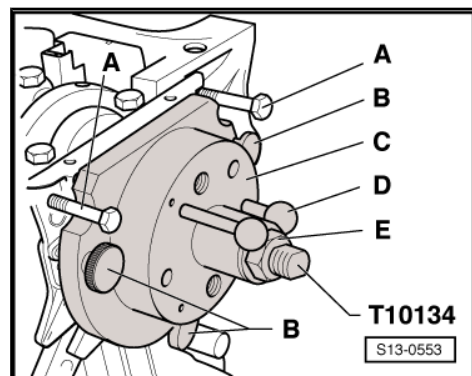
- Installing intermediate plate.

- Install two-mass flywheel with new screws. Tighten fixing screws to 60 Nm + torque a further 90° (1/4 turn).



E - Pressing down the rotor

- Screw assembly tool -T10134- with Allan screws up to the stop onto the crankshaft flange.
- Screw in three knurled screws -B- into the flange.
- Subsequently insert the guide bolt with black ball -D- fully into the threaded bore of the crankshaft. If the guide bolt is correctly positioned, then the handle has a distance of approx. 10 mm from the assembly cup -C-.
- Screw in hexagon nut -E- by hand onto the threaded spindle until it rests against the assembly cup.



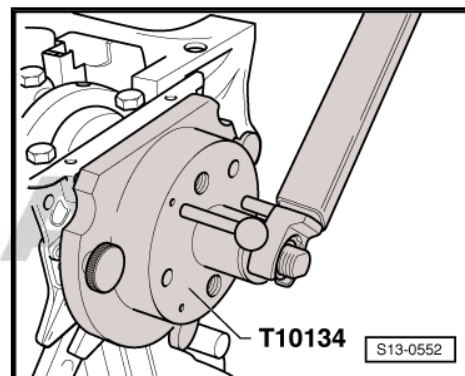
- Tighten the hexagon nut of the assembly tool using a torque wrench with adapter.

Tightening torque: 40 Nm

- Again inspect the fitting position of the rotor on the crankshaft
⇒ [page 53](#) .

If the dimension -a- is again too small:

- Tighten the hexagon nut of the assembly tool to 45 Nm.
- Again inspect the fitting position of the rotor on the crankshaft
⇒ [page 53](#) .



2.4 Removing and installing the two-mass flywheel

Special tools and workshop equipment required

- ◆ Counterholder -MP1-223 (3067)-

or

- ◆ Engine mount -MP1-202 (VW 540)-
- ◆ Bushing -T30010 (VW 540/1B)-
- ◆ Flywheel lock -MP1-504 -

Removing

- Gearbox is removed.

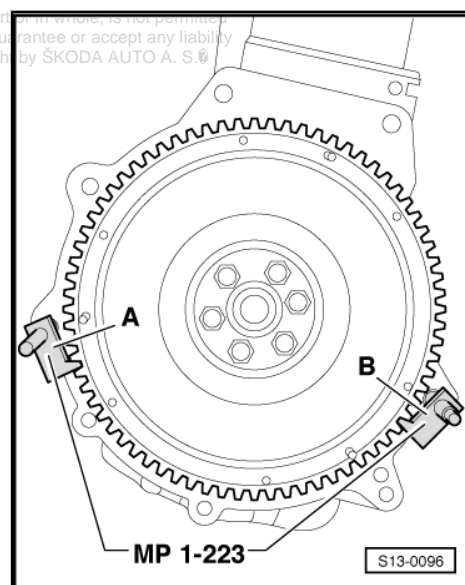
Engine installed

- Insert the counterholder -MP1-223 (3067)- into the bore hole on the cylinder block.

- Fitting position of the counterholder:

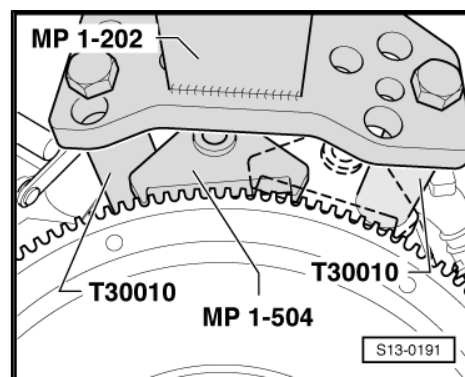
A - for tightening

B - for slackening



Engine removed

- Position the flywheel lock -MP1-504- on the starter ring gear of the flywheel disk and turn crankshaft until it rests against the sleeve -T30010 - .





Continued for all engines

- Rotate the secondary side -A- of the two-mass flywheel in such a way that the screws -B- are positioned in the middle of the holes -arrows-.



Caution

When unscrewing the screws -B-, ensure that no screw head catches on the secondary side -A- of the two-mass flywheel, otherwise the flywheel will be damaged.

- Release screws -B- and remove two-mass flywheel.

Install

Installation occurs in reverse order to removal. Pay attention to the following:

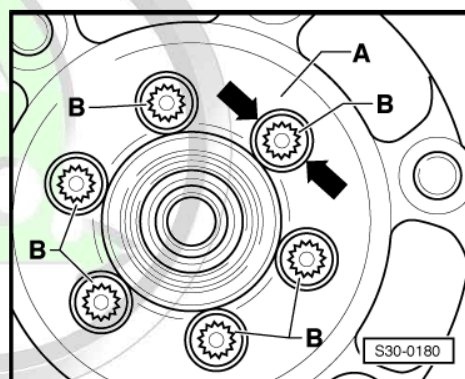
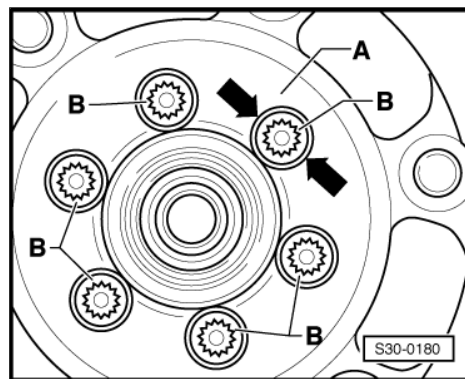


Note

Use new screws for attaching.

- Rotate the secondary side -A- of the two-mass flywheel in such a way that the fixing screws -B- are positioned in the middle of the holes -arrows-.

1. Screw in all the screws -B- by hand.
2. First of all tighten all the screws -B- crosswise to 60 Nm.
3. Then torque all the screws -B- crosswise a further 90° (1/4 turn.)



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3 Crankshaft, Piston and Conrod

3.1 Removing and installing crankshaft



Note

The engine should be attached to the engine repair stand with the engine holder -MP1-202- for carrying out removal and installation work.

1 - 65 Nm + torque a further 90°
(1/4 turn)

- ☐ replace

2 - Bearing caps

- ☐ Bearing cap 1: belt pulley side
- ☐ Bearing cap 3: with recesses for thrust washers
- ☐ retaining lugs of the bearing shells of the cylinder block/bearing cap must be on top of one another

3 - Bearing shell 3

- ☐ for cylinder block with lubricating groove
- ☐ for bearing cap without lubricating groove
- ☐ do not mix up used bearing shells (mark)

4 - Thrust washers

- ☐ pay attention to locating element

5 - Needle bearing

- ☐ only vehicles with automatic gearbox
- ☐ replace ➔ [page 58](#)

6 - Crankshaft

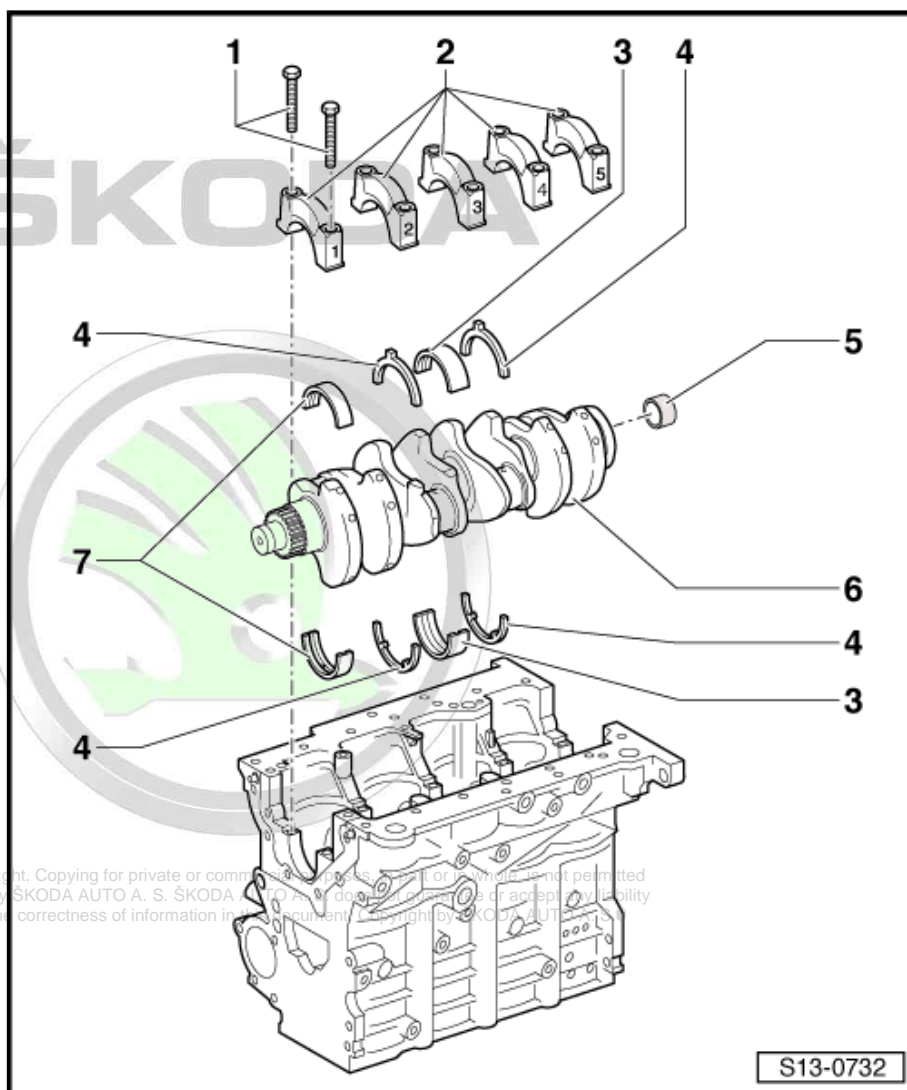
- ☐ with timing belt sprocket for oil pump drive
- ☐ Axial play when new: 0.07...0.17 mm

Wear limit: 0.37 mm

- ☐ Crankshaft bearing pins: \varnothing 54.00 mm
- ☐ Conrod bearing pin: \varnothing 50.90 mm

7 - Bearing shells 1, 2, 4 and 5

- ☐ for cylinder block with lubricating groove
- ☐ for bearing cap without lubricating groove
- ☐ do not mix up used bearing shells (mark)



S13-0732

3.2 Replace needle bearing for crankshaft

Only on vehicles equipped with automatic gearbox.

Special tools and workshop equipment required

- ◆ Centering mandrel -T30029 (3176)-
- ◆ Interior extractor -Kukko 21/2-
- ◆ Countersupport -Kukko 22/1-



Note

For installing an engine in a vehicle with automatic gearbox, check whether the needle bearing is built on the gearbox side in the crankshaft. Install the needle bearing as required.

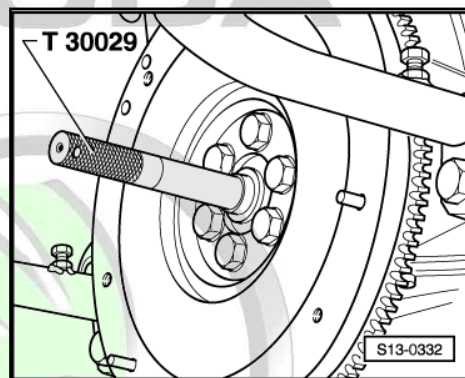
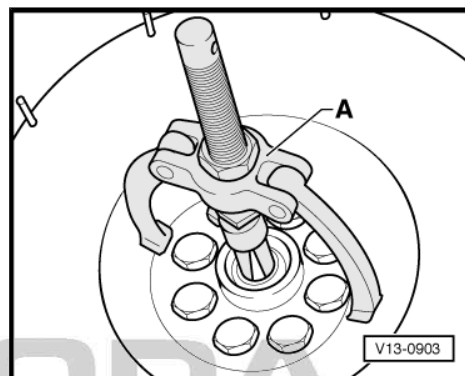
Removing

- Pull out needle bearing with interior extractor -Kukko 21/2- and countersupport -Kukko 22/1- .

Install

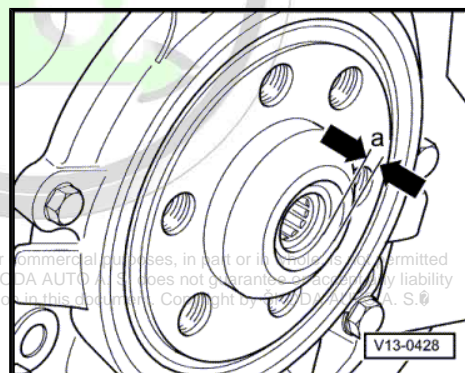
- Fitting position: The marked side of the needle bearing should be legible when in its installed condition.

- Drive in the needle bearing using the centering pin -T30029- .



Depth of installation of the needle bearing.

- Dimension -a- = 1.5 up to 1.8 mm



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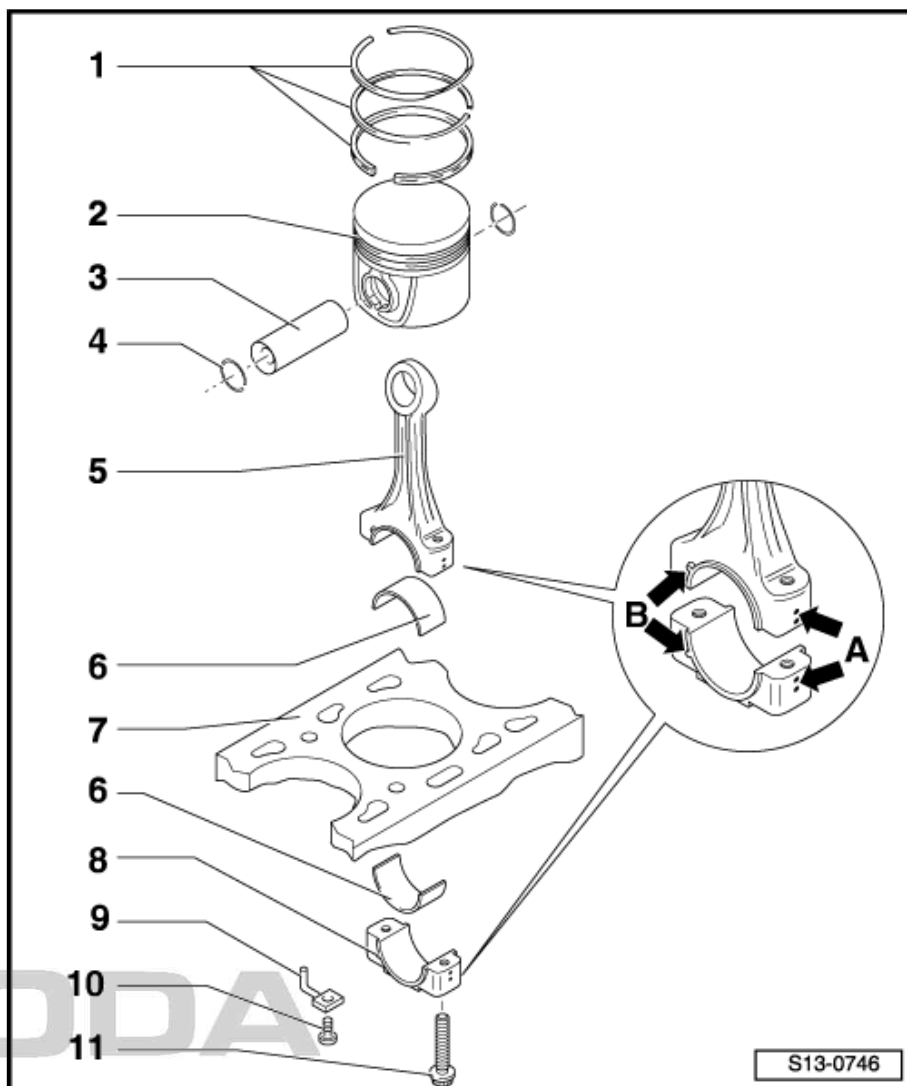
3.3 Disassembling and assembling pistons and conrods

1 - Piston rings

- ☐ Offset joint 120°
- ☐ use piston ring pliers for removing and installing
- ☐ marking „TOP“ faces piston crown
- ☐ Inspect gap clearance
⇒ [page 60](#)
- ☐ Inspect end clearance
⇒ [page 60](#)

2 - Piston

- ☐ with combustion chamber
- ☐ mark installation position and matching cylinder
- ☐ Installation position and assignment of piston/cylinder ⇒ [page 61](#)
- ☐ arrow on the piston crown faces towards the belt pulley side
- ☐ replace piston if there is any sign of crack formation on the piston body
- ☐ Inspecting piston
⇒ [page 61](#)
- ☐ Piston dimension: Ø 80,95 mm
- ☐ use piston ring tensioning strap for installing
- ☐ inspect piston projection at TDC ⇒ [page 62](#)



3 - Piston pin

- ☐ if stiff, heat piston to 60°C
- ☐ use drift -VW 222A- for removing and installing

4 - Circlip

- ☐ replace

5 - Conrod

- ☐ with a split bearing cap
- ☐ always replace as a set only
- ☐ mark matching cylinder -A-
- ☐ Fitting position: Markings -B- point towards the belt pulley side
- ☐ separate new conrod ⇒ [page 63](#)
- ☐ Axial clearance: Wear limit 0.37 mm

6 - Bearing shell

- ☐ Fitting position ⇒ [page 62](#)
- ☐ do not mix up used bearing shells (mark)
- ☐ Observe version: top bearing shell (towards the piston) must be made from a long lasting material, recognition feature for new bearing shells: black marking on the contact surface near the separation point
- ☐ insert in middle ⇒ [page 62](#)
- ☐ pay attention to correct position

7 - Cylinder block

- ☐ Inspect cylinder ⇒ [page 61](#)



- ☐ Cylinder dimension: \varnothing 81,01 mm

8 - Conrod bearing cap

- ☐ Check fitting position
- ☐ cracked cover fits only in one position at the relevant conrod
- ☐ separate new conrod ➔ [page 63](#)

9 - Oil injection nozzle

- ☐ for piston cooling
- ☐ removing and installing ➔ [page 62](#)

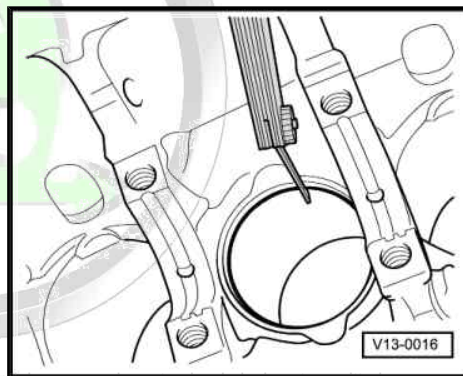
10 - Pressure valve, 27 Nm

- ☐ replace without sealant
- ☐ removing and installing ➔ [page 62](#)

11 - 30 Nm + torque a further 90° (1/4 turn)

- ☐ replace
- ☐ Oil thread and contact surface

Inspecting piston ring gap clearance



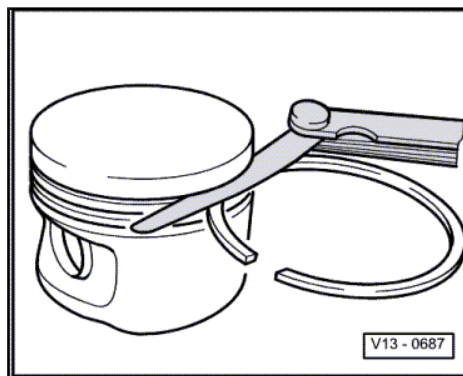
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Special tools and workshop equipment required

- ◆ Feeler gauge
- Insert ring at right angles from above down into lower cylinder opening, about 15 mm away from edge of cylinder. To insert use piston without rings.

Piston ring (dimensions in mm)	new	Wear limit
1. Compression ring	0,20 ... 0,40	1,00
2. Compression ring	0,20 ... 0,40	1,00
Oil scraper ring	0,25 ... 0,50	1,00

Inspect piston ring end clearance

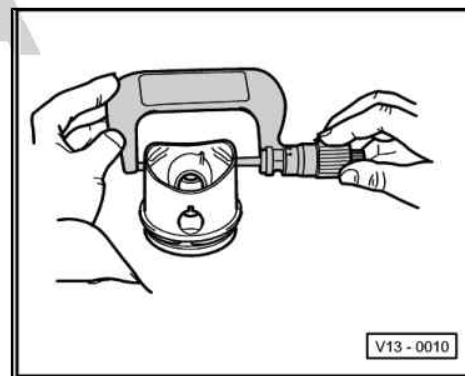


Special tools and workshop equipment required

- ◆ Feeler gauge
- Clean before inspecting the annular grooves of the piston.

Piston ring (dimensions in mm)	new	Wear limit
1. Compression ring	0,06 ... 0,09	0,25
2. Compression ring	0,05 ... 0,08	0,25
Oil scraper ring	0,03 ... 0,06	0,15

Inspecting pistons

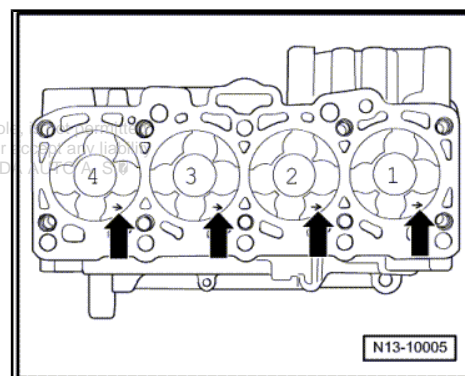


Special tools and workshop equipment required

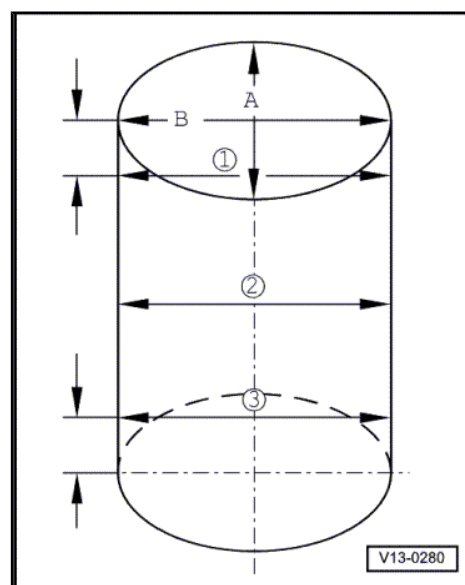
- ◆ External micrometer
- Measure about 10 mm from the lower edge, offset at right angles to the piston pin shaft.
- Max. deviation from specified dimension: 0,04 mm

Installation position and assignment of piston/cylinder

- The arrow on the piston crown -arrows- faces towards the belt pulley side.



Inspecting cylinder bore

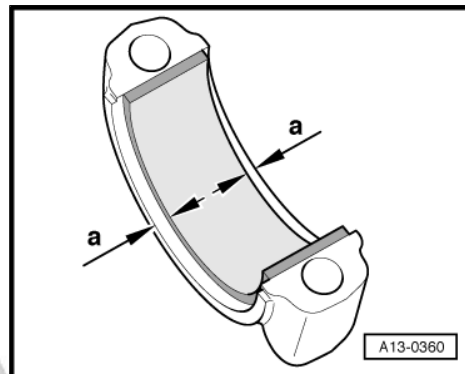


Special tools and workshop equipment required

- ◆ Internal precision measuring instrument
- Measure cylinder at 3 points crosswise in transverse direction -A- and lengthwise -B-.
- Max. deviation from specified dimension: 0.10 mm

Fitting position of the bearing shells in the conrods

- Insert bearing shell in the conrod or in the center of the conrod bearing cap.
- Dimension -a- = 2.5 mm

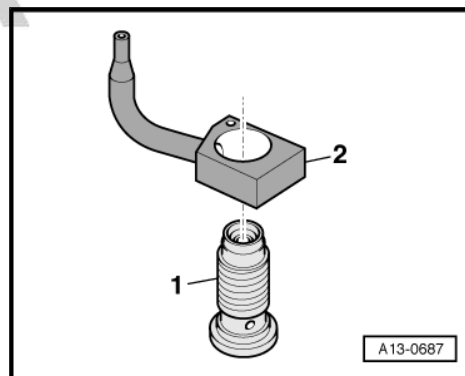


Oil spray nozzle and pressure valve

- 1 - Screw with pressure valve
 - 2 - Oil spray nozzle (for cooling piston)
- Fitting position: Align the guide edge of the oil spray nozzle to the edge of the cylinder block being worked on.

Note

- ◆ *The oil injection nozzles must not be bent.*
- ◆ *Replace the oil injection nozzles if they are bent.*



3.4 Checking piston projection in TDC

Special tools and workshop equipment required

- ◆ Measuring tool for liner pretension -MP1-107-

Test sequence

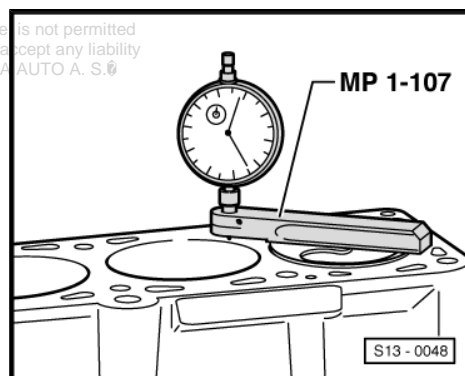
- Attach the measuring tool for liner pretension -MP1-107- to the cylinder block as shown in the illustration.
- Measure the projection for each cylinder at 2 points.

When fitting new pistons or a partial engine, check the piston projection in TDC on all pistons.

If different values are measured during the projection measurement of the piston, the greatest dimension applies for the seal assignment.

Depending on the piston projection fit the relevant cylinder head seal in accordance with the table below.

Piston projection over cylinder block top side mm	Marking of bores
0,91 ... 1,00	1
1,01 ... 1,10	2
1,11 ... 1,20	3



Identification of the cylinder head gasket

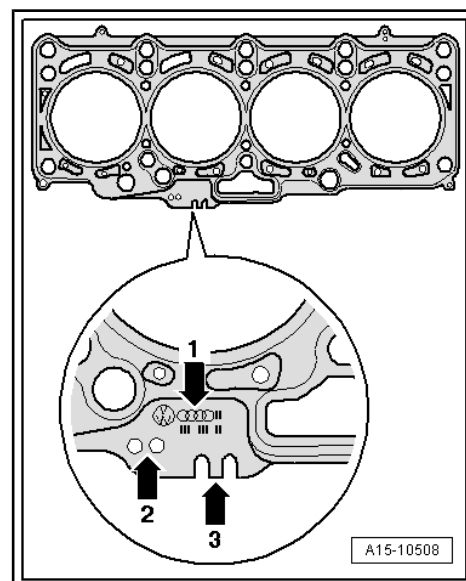
- ◆ Part number -arrow 1-
- ◆ Bores -arrow 2-
- ◆ Notches -arrow 3- (ignore)



Note

If different values are measured during the projection measurement of the piston, the greatest dimension applies for the seal assignment.

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3.5 Separating new conrod

It can happen that the predetermined breaking point on the new conrod is not completely pierced. If the conrod bearing cap cannot be removed by hand, then proceed as follows:

- Mark the assignment of the conrod to the cylinder.
- Slightly tension the conrod, as shown in the illustration, in a vice provided with aluminium protective jaws.

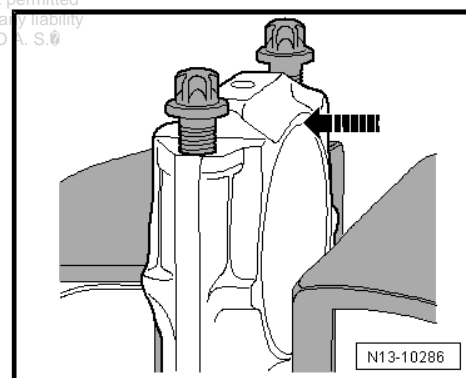
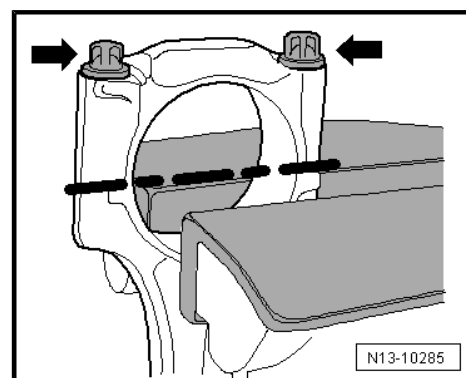


Note

- ◆ *Only tension the conrod slightly in order to avoid damage on the conrod.*
- ◆ *The conrod is clamped beyond the breaking point, which is shown in the figure with a broken line.*

- Unscrew both screws -arrows- by approx. 5 turns.

- Carefully knock against the conrod bearing cap with a plastic hammer in -direction of arrow- in order to loosen it.





15 – Cylinder head, valve gear

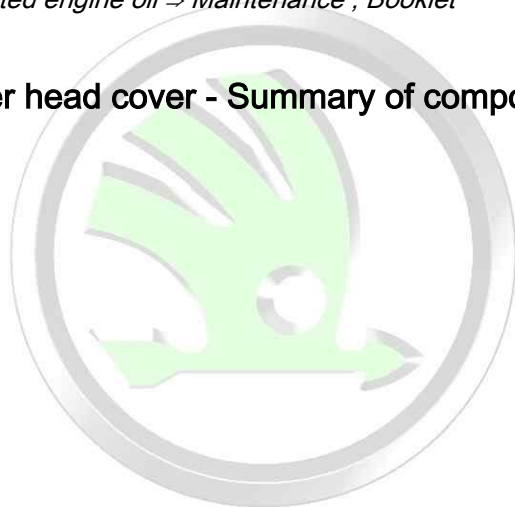
1 Removing and installing the cylinder head



Note

- ◆ *Cylinder heads with cracks between the valve seats may continue to be used without any reduction in the life time provided the cracks are slight and max. 0.5 mm wide.*
- ◆ *It is not permissible to rework the cylinder heads of diesel engines.*
- ◆ *Replace O-rings and gaskets.*
- ◆ *Replace cylinder head bolts and screws which have been tightened to a torquing angle.*
- ◆ *When installing an exchange cylinder head with the camshafts installed, it is necessary to oil the contact surfaces between the roller arms and the cams after installing the head.*
- ◆ *Do not remove the plastic bases supplied as a protection for the open valves until just before fitting on the cylinder head.*
- ◆ *When replacing the cylinder head, replace all the coolant
⇒ [page 115](#).*
- ◆ *Change contaminated engine oil ⇒ Maintenance ; Booklet Octavia II .*

1.1 Cylinder head cover - Summary of components



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1 - Gasket

- ☐ replace if damaged or leaking

2 - Cylinder head cover

- ☐ removing and installing
⇒ [page 66](#)

3 - O-ring

- ☐ replace

4 - Hose

- ☐ for crankcase ventilation
- ☐ to remove, press release buttons

5 - Sealing bush

- ☐ for fixing screw of fuel high pressure reservoir
- ☐ replace if damaged or leaking

6 - Support

- ☐ for electrical cables

7 - Grommet

8 - Clamping claw

- ☐ together with 2 injection units

9 - 8 Nm

10 - Fuel high pressure reservoir

- ☐ Observe rules for cleanliness ⇒ [page 4](#)
- ☐ Do not change the bending form of the high pressure pipes
- ☐ Install high pressure pipes ⇒ [page 199](#)

11 - 22 Nm

12 - 8 Nm + torque a further 180° (1/2 turn)

- ☐ replace

13 - Fuel return-flow line

14 - O-ring

- ☐ replace

15 - Injection unit (Piezo injector)

- ☐ Observe rules for cleanliness ⇒ [page 4](#)
- ☐ removing and installing ⇒ [page 196](#)

16 - O-ring

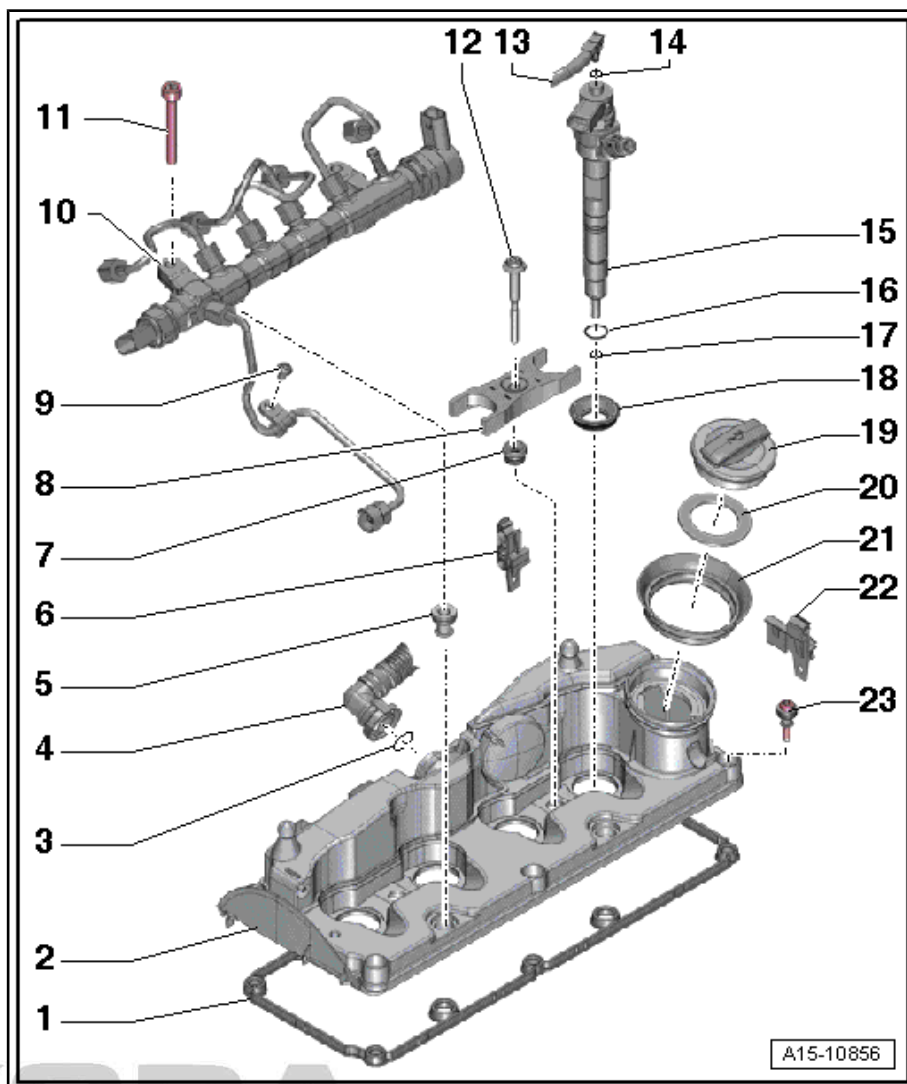
- ☐ replace

17 - Heat-protection seal

- ☐ replace

18 - Sealing ring

- ☐ Injection units
- ☐ replace ⇒ [page 68](#)





19 - Screw cap

20 - Gasket

- ☐ for cap

21 - Grommet

22 - Support

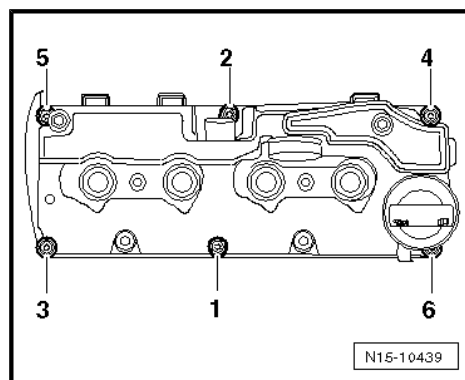
- ☐ for electrical cables

23 - Screw, 10 Nm

- ☐ Replace seal if damaged
- ☐ tightening order and tightening torque ➔ [page 66](#)

Cylinder head cover - tightening torque and tightening order

- Tighten the screws for the cylinder head cover in the sequence -1 ... 6- to 10 Nm.



1.2 Removing and installing cylinder head cover

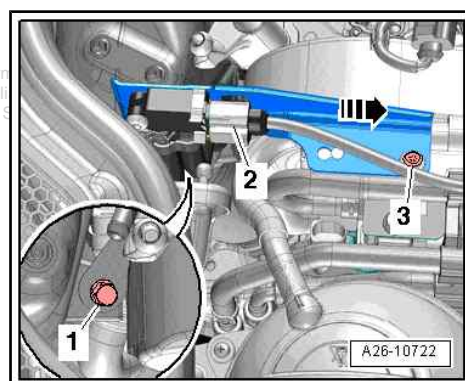
Removing

- Remove engine cover ➔ [page 7](#) .

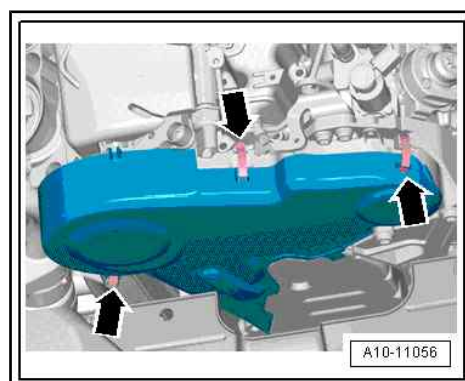
Engine with identification characters CFHC, CFHF

- Disconnect plug -2- at differential pressure indicator -G505- .
- Screw out screw -3-, remove bracket with differential pressure sender -G505- from the bracket of the additional fuel pump in -direction of arrow- and place it to the side.

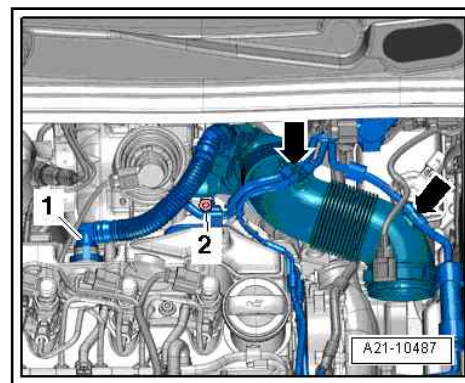
Continued for all engines



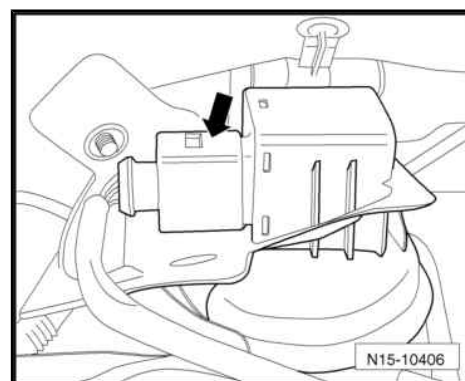
- Release the clamps -arrows- and press the toothed belt guard - top part to the right side.
- Remove the injection units ➔ [page 196](#) .
- Remove high pressure reservoir ➔ [page 200](#) .



- Remove the hose -1- for the crankcase ventilation from the cylinder head cover, to do so press the release buttons.

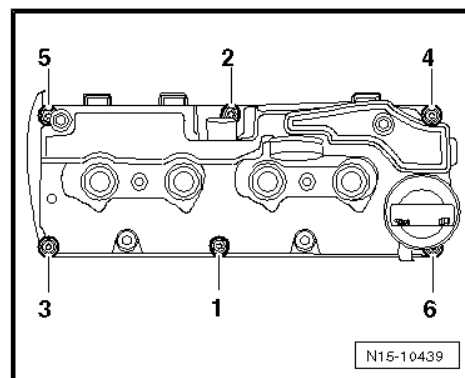


- Disconnect the plug -arrow- on the position sender for charge pressure regulator -G581- .
- Remove the vacuum lines from the bracket at the cylinder head cover.



- Slacken the screws for the cylinder head cover in the sequence -6 ... 1- and release them.

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- Unclip the cylinder head cover at the catch pegs -arrows- of the rear toothed belt guard and remove it from the cylinder head.

Install

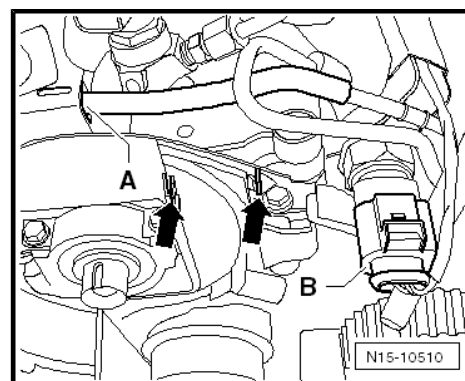
Installation is performed in the reverse order, pay attention to the following points:



Note

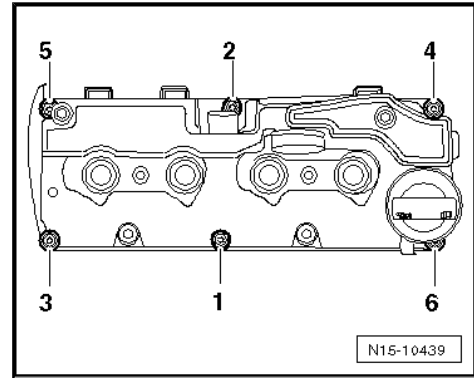
- ◆ Replace gasket and screws for cylinder head cover if damaged or leaking.

- ◆ Replace grommets and gasket rings for injection units if damaged or leaking.





- Tighten the screws for the cylinder head cover in the sequence -1 ... 6- to 10 Nm.



- Make sure that the cylinder head cover is correctly clipped with the rear toothed belt guard, -arrows-.



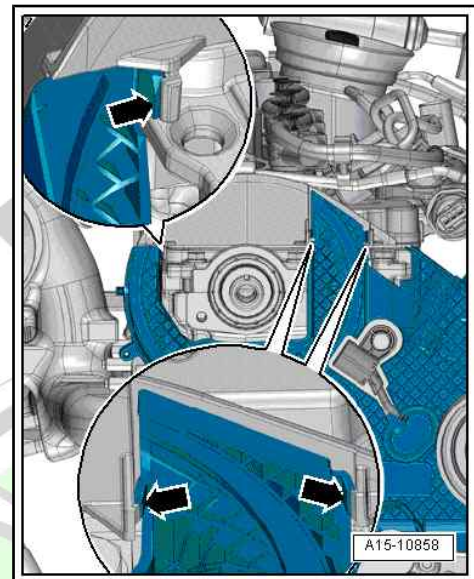
Note

To provide a clearer illustration, the fitting position is shown with the hub removed and the toothed belt sprocket removed at the camshaft.

- Check the clearance between the hub and the rear toothed belt guard.
- Install coolant return-flow line.

Engine with identification characters CFHC, CFHF

- Install differential pressure indicator -G505- .



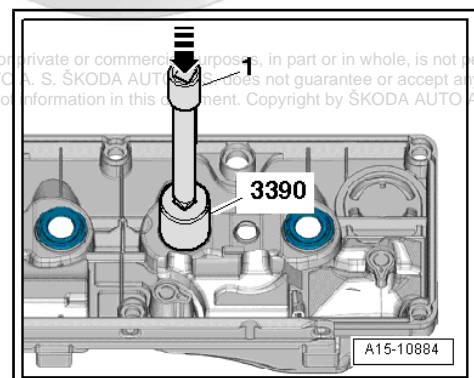
1.2.1 Replacing gasket rings for injection units

Special tools and workshop equipment required

- ◆ Driver -3390-

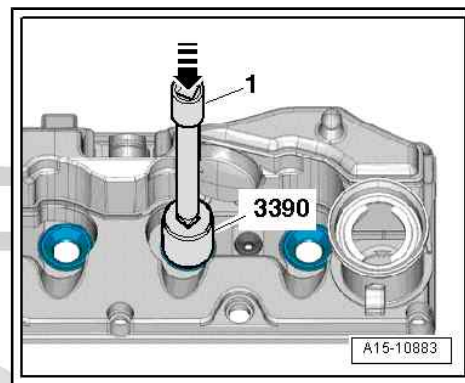
Work procedure

- Remove cylinder head cover ➔ [page 66](#) .
- Press out the old gasket ring for the injection unit using the driver -3390- and a short extension -1- from the inside of the cover outwards.



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- Press in the new gasket ring for the injection unit using the driver -3390- and a short extension -1- from the outside of the cover up to the stop.
- Install cylinder head cover ➔ [page 66](#) .



1.3 Cylinder head - summary of components

Note

- ◆ Do not remove the plastic bases supplied as a protection for the open valves until just before fitting on the cylinder head.
- ◆ When replacing the cylinder head, replace all the coolant ➔ [page 115](#) .

1 - Cylinder head gasket

- ☐ replace
- ☐ Pay attention to the marking ➔ [page 71](#)
- ☐ after replacing fill entire system with fresh coolant ➔ [page 115](#)

2 - 10 Nm

- ☐ insert using locking agent ➔ Electronic Catalogue of Original Parts

3 - Hall sender -G40-

- ☐ for camshaft position
- ☐ removing and installing ➔ [page 79](#)

4 - Cylinder head

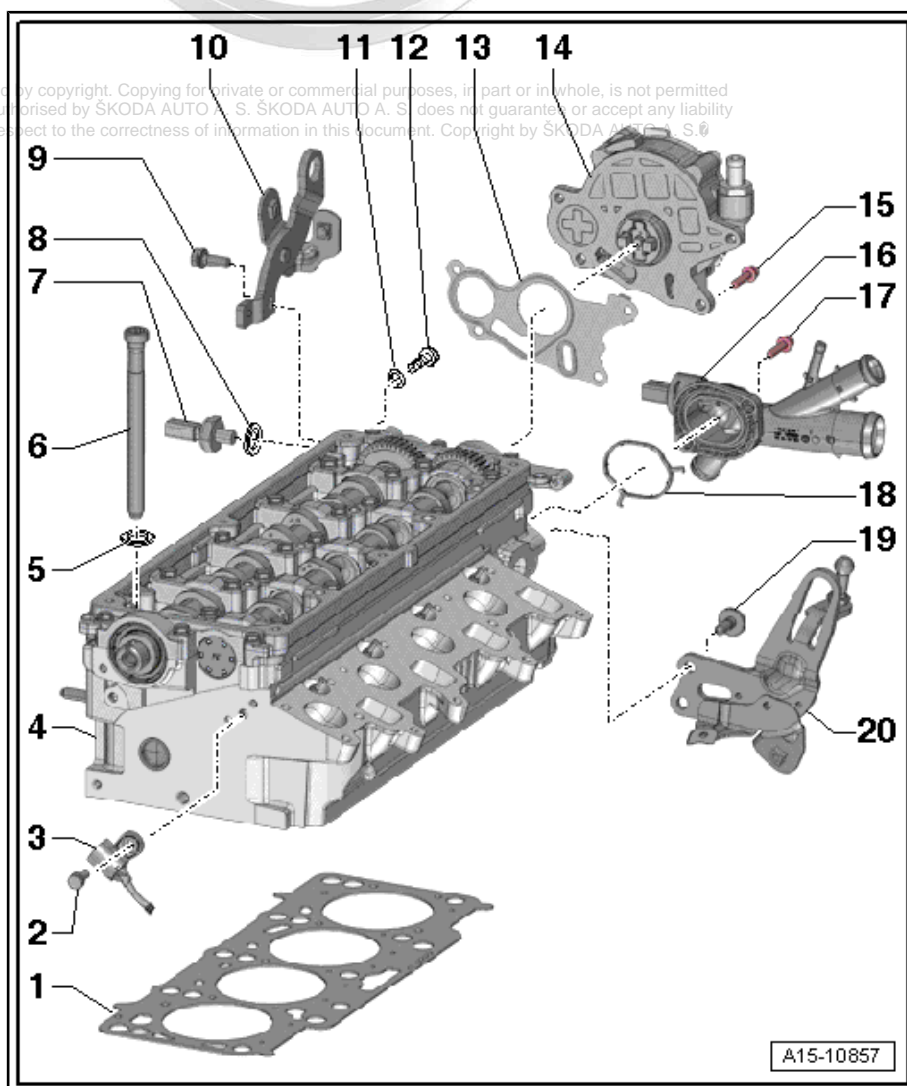
- ☐ removing and installing ➔ [page 71](#)
- ☐ check for distortion ➔ [page 71](#)
- ☐ after replacing fill entire system with fresh coolant ➔ [page 115](#)

5 - Washer

- ☐ for cylinder head screw ➔ [Item 6 \(page 69\)](#)

6 - Cylinder head bolt

- ☐ replace
- ☐ pay attention to sequence for loosening and tightening





⇒ [page 71](#)

- ☐ before fitting insert washers ⇒ [Item 5 \(page 69\)](#) in the cylinder head

7 - Oil pressure switch -F1- , 22 Nm

- ☐ Marking: green
- ☐ 0.05 MPa (0.5 bar)
- ☐ Cut open gasket ring if leaking and replace
- ☐ removing and installing ⇒ [page 107](#)
- ☐ check ⇒ [page 108](#)

8 - Sealing ring

- ☐ replace

9 - 20 Nm

10 - Lifting eye

- ☐ at rear left of cylinder head

11 - Sealing ring

- ☐ replace

12 - Screw plug, 14 Nm

- ☐ the oil duct

13 - Gasket

- ☐ replace

14 - Vacuum pump



WARNING

The vacuum pump must on no account be disassembled, otherwise the proper operation of the pump vacuum part is no longer assured. This will result in a failure of the brake booster.

- ☐ removing and installing ⇒ [page 80](#)

15 - 10 Nm

16 - Connection fittings

- ☐ for coolant with coolant temperature sender -G62-
- ☐ Replace coolant temperature sender -G62- ⇒ [page 119](#)

17 - 9 Nm

18 - Gasket

- ☐ replace

19 - 20 Nm

20 - Lifting eye

- ☐ at front left of cylinder head

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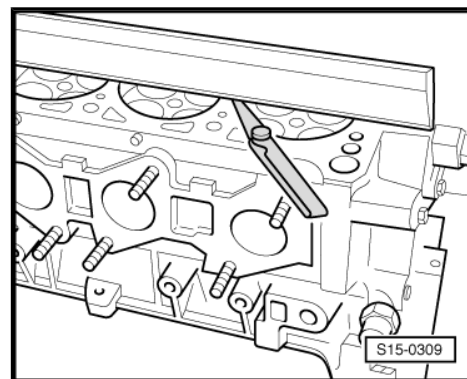
Inspecting the cylinder head for distortion

- Inspect cylinder head at several points for distortion using a knife-edge straightedge and feeler gauge.
- Max. permissible distortion: 0.1 mm



Note

It is not permissible to rework the cylinder heads of diesel engines.



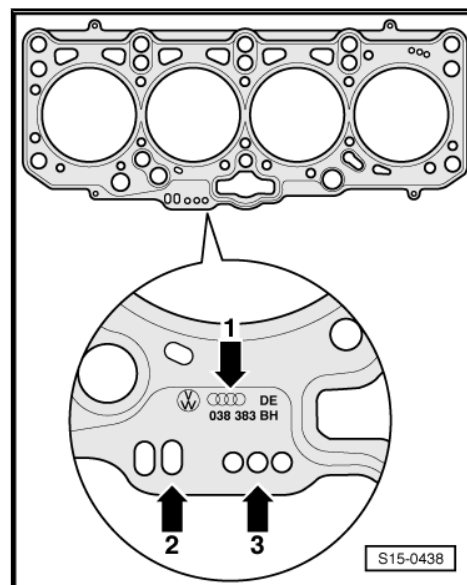
Identification of the cylinder head gasket

- ◆ Part number -arrow 1-
- ◆ Control code -arrow 2- (ignore)
- ◆ Bores -arrow 3-



Note

- ◆ *Differing thicknesses of cylinder head gaskets are inserted according to the piston projection. If only the gasket is replaced, it must be replaced with a new gasket with the same marking.*
- ◆ *When fitting new pistons or a partial engine, check the piston projection in TDC on all pistons ➔ [page 62](#) .*



1.4 Removing and installing the cylinder head

Special tools and workshop equipment required

- ◆ Guide bolt -MP1-208 (3070)-
- ◆ Rig pin for the diesel injection pump -3359- or -MP1-301- (2x)
- ◆ Crankshaft arrester -T10050-
- ◆ Counterholder -T10051 -
- ◆ Extractor -T10052-
- ◆ Socket insert XZN 10 -T10385-
- ◆ Catch pan for workshop crane , e.g. -VAS 6208-
- ◆ Sealant remover gasket stripper (bearing code GST, bearing article no. R 34402), manufacturer Retech s.r.o.
- ◆ Locking agent -D 000 600 A2-
- ◆ Protective goggles and gloves



Caution

When undertaking all installation work, particularly in the engine compartment because of its cramped construction, please observe the following:

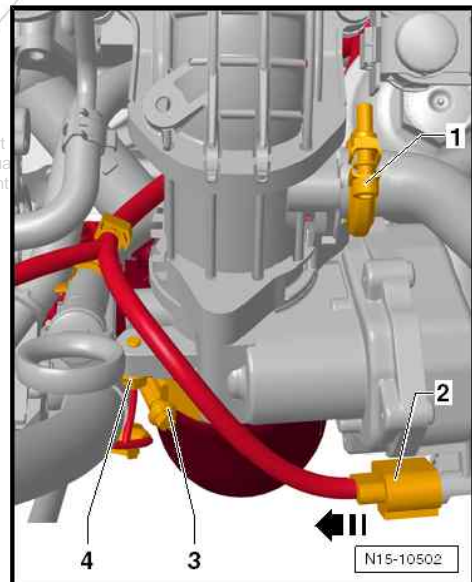
- ◆ *Lay lines of all kinds (e.g. for fuel, hydraulic fluid, cooling fluid and refrigerant, brake fluid, vacuum) and electrical lines in such a way that the original line guide is re-established.*
- ◆ *In order to avoid damage to the cables, ensure that there is adequate free access to all moving or hot components.*

Observe all safety measures and notes for assembly work on the fuel and injection system, the charge air system as well as the rules for cleanliness ⇒ [page 2](#) .

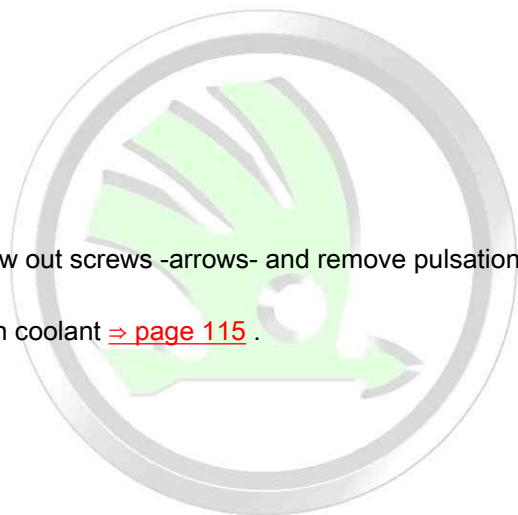
1.4.1 Removing

Requirements

- Engine temperature should not exceed 35 °C, because the cylinder head could be twisted when slackening the screws.
- The pistons must not be in TDC.
- Remove air filter with air mass meter -G70- and inlet hose ⇒ [page 214](#) .
- Remove battery and battery tray ⇒ Electrical System ⇒ Rep. gr. 27 .
- Remove fan shroud for radiator fan -V7- and -V35- ⇒ [page 128](#) .
- Remove cylinder head cover ⇒ [page 66](#) .
- Disconnect the plug -2- from the throttle valve control unit -J338 - .
- Screw out the fixing screw of the oil dipstick -4-.
- Detach the vacuum line from the vacuum pump.



- Unscrew screws -2, 5- and -arrows-.
- Expose electrical cables and hoses on the left charge air pipe.
- Release hose clamp -3- and remove left charge air pipe.

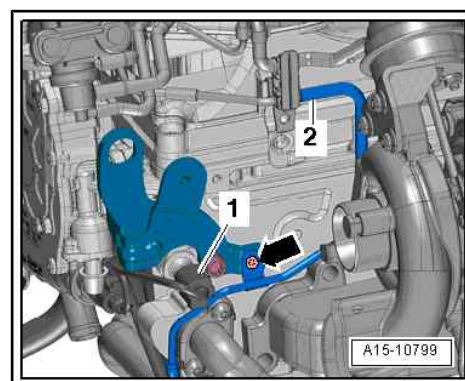
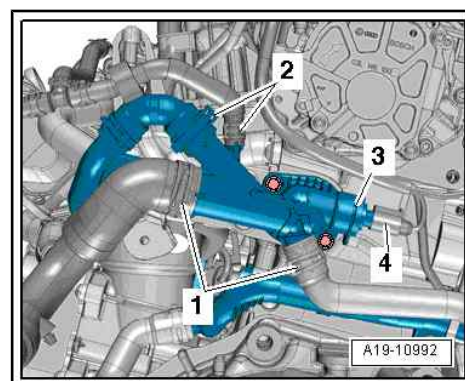
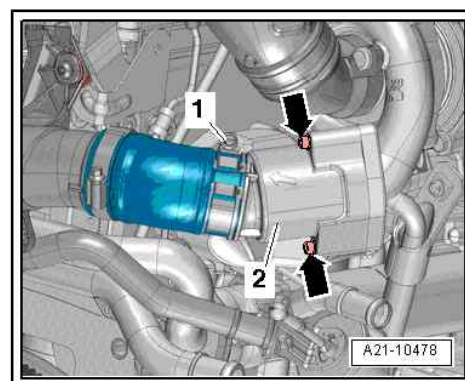
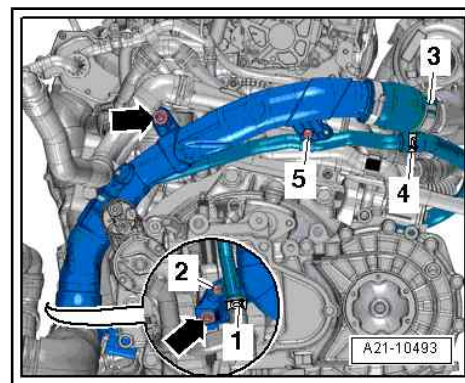


- Screw out screws -arrows- and remove pulsation dampener -2-.
- Drain coolant ➔ [page 115](#) .

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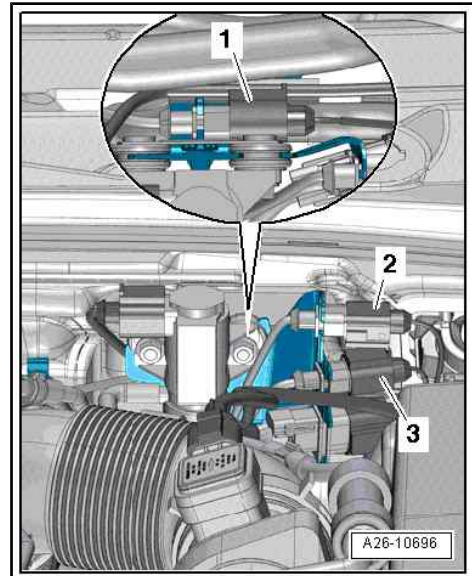
- Disconnect plug -4- at the coolant temperature sender -G62- .
- Remove the coolant hoses from the connection fitting, to do so slacken the hose clamps -1- and -2-

- Disconnect plug -1- at oil pressure switch -F1- .
- Release screw -arrow-.
- Disconnect vacuum hose -2-.





- Pull the plug connection -3- out of the fixture and disconnect.
- Expose electrical cables at exhaust gas turbocharger.

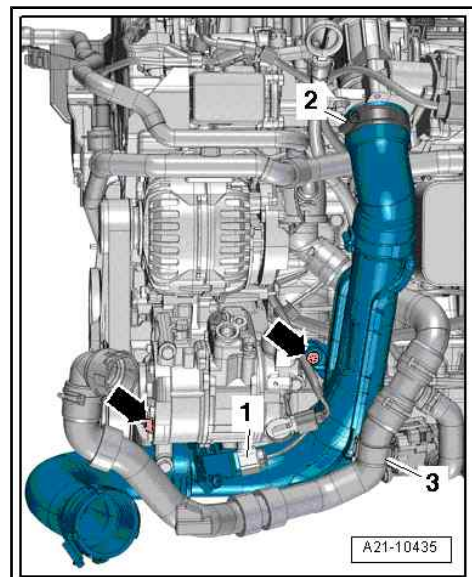


- Release screws -arrows-.
- Expose coolant hose -3-.
- Loosen hose clamp -2-.
- Disconnect the plug -1- at the charge pressure sender -G31- / intake air temperature sender -G42- and remove the right charge air pipe.

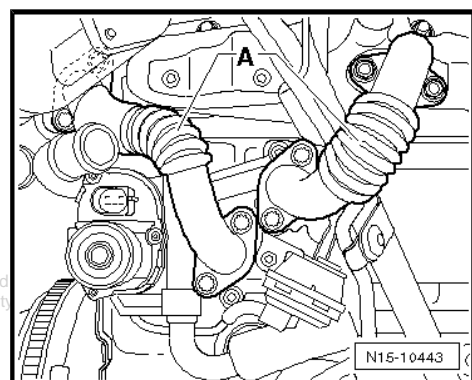


Caution

Pay attention that the bellows of the connection pipe is not bent or overstretched. There is a risk of crack formation.

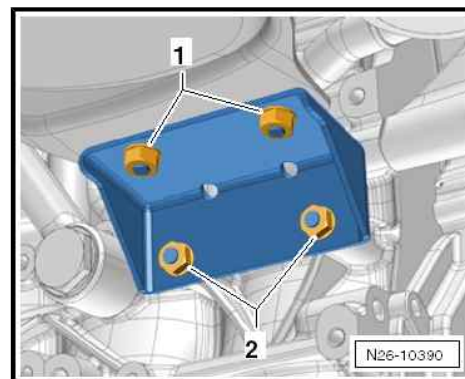


- Remove connection pipes for exhaust gas recirculation -A- with the socket insert XZN 10 -T10385- .

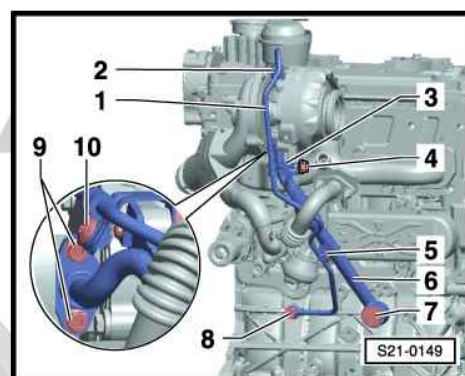


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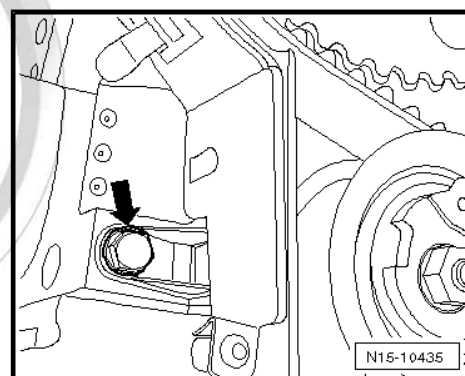
- Unscrew the nuts -2- of the bracket for the pre-exhaust pipe at the cylinder block.



- Screw out screws -5- and -10-.
- Unscrew the union nut -2- and place the oil feed line -1- to the rear.
- Release screw -4- and remove bracket -3-.

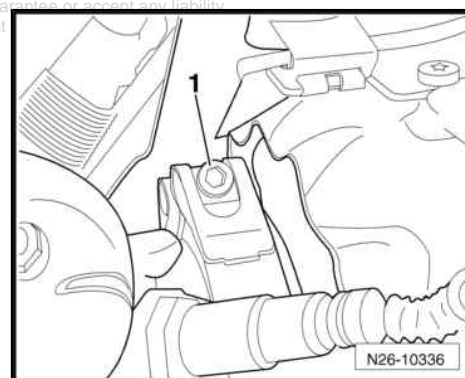


- Unscrew the screw -arrow- on the rear timing belt guard.



- Slacken the screw -1- of the fixing clamp between the exhaust gas turbocharger and the pre-exhaust pipe.

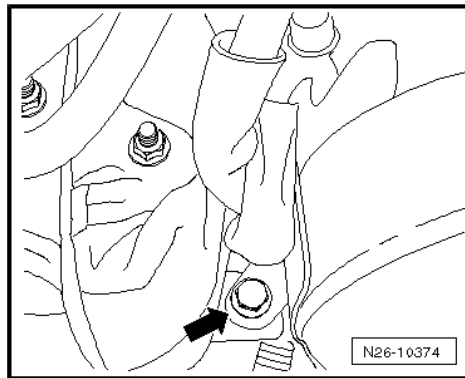
Engines with identification characters CFHC, CFHF and CLCB



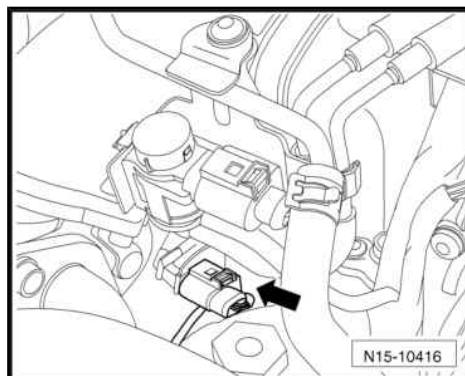


- Release the screw -arrow- from the bracket at the cylinder head and push the pre-exhaust pipe to the side.

Continued for all engines



- Disconnect plug at Hall sender -G40- -arrow-.
- Remove the toothed belt from the camshaft ➔ [page 33](#) .
- Remove camshaft sprocket and pull off the hub of the camshaft with the extractor -T10052- .
- Release the fixing nut of the timing belt tensioning pulley.



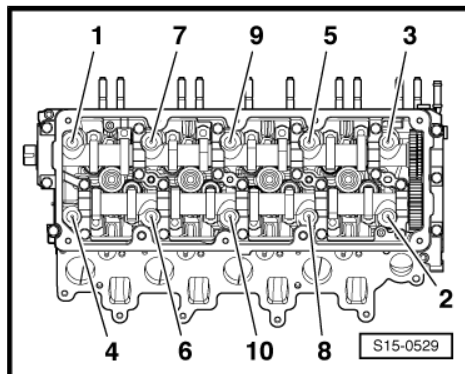
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- Follow the sequence -1...10- for loosening the cylinder head screws.



Note

- ◆ *The assistance of a second mechanic is required for removing the cylinder head.*
- ◆ *The timing belt tensioning pulley is removed from the pin screw when lifting out the cylinder head.*
- ◆ *The oil return-flow line for the exhaust gas turbocharger is detached from the support when removing the cylinder head.*
- First of all raise the cylinder head on the gearbox side and thread it out of the rear toothed belt guard. Make sure that the timing belt tensioning pulley does not fall down.



Caution

Risk of damage to the glow plugs when placing down the cylinder head.

- ◆ *If the cylinder head is removed with installed glow plugs, do not place it down on the sealing surface since the glow plugs protrude slightly beyond the sealing surface.*

- Place down the cylinder head in such a way that the oil return flow line does not bend, if necessary place a wooden wedge under the exhaust manifold.

1.4.2 Install



Note

- ◆ *There must not be any oil or coolant present in the threaded holes for the cylinder head bolts.*
- ◆ *Replace cylinder head screws, self-locking nuts and all the screws which have been tightened to a torquing angle.*
- ◆ *Always replace gasket rings and seals.*
- ◆ *Remove the new cylinder head gasket from its wrapping immediately before fitting.*
- ◆ *Treat the seal with the utmost care. Damage to the silicone layer and in the area of the bead results in leakages.*
- ◆ *When installing an exchange cylinder head with the camshafts installed, it is necessary to oil the contact surfaces between the roller arms and the cams after installing the cylinder head.*
- ◆ *Secure all hose connections with corresponding hose clips.*



WARNING

Wear protective gloves when working with sealant and grease remover!

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Note

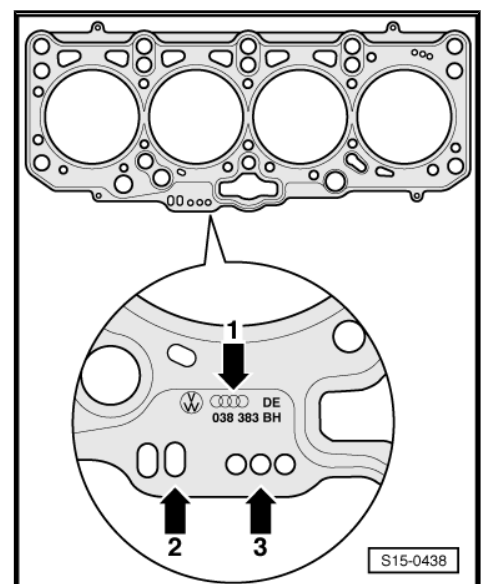
Make sure that when cleaning the cylinder head and cylinder block no foreign bodies can get into the cylinder, the oil and coolant galleries or into the threaded holes.

- Carefully remove old sealant residue from the cylinder head and cylinder block using a chemical sealant remover.
- Remove the crankshaft arrester -T10050- before placing on the cylinder head and turn the crankshaft in the opposite direction of rotation of engine until all the pistons are almost evenly positioned at the same height.
- Pay attention to the identification of the cylinder head seal.
- ◆ Part number -arrow 1-
- ◆ Control code -arrow 2- (ignore)
- ◆ Bores -arrow 3-



Note

- ◆ *Install a new cylinder head gasket with the same marking, irrespective of whether or not the cylinder head was replaced.*
- ◆ *If parts of the crankshaft drive were replaced, then the new cylinder head gasket must be redefined by measuring the protrusion of the piston in TDC ⇒ [page 62](#).*
- Position the cylinder head gasket with the marking to the top.





- For centering, screw in guide bolts -MP1-208 (3070)- into the outer holes on the suction side.



Note

The tensioning pulley for timing belt must be fitted onto the pin screws when placing on the cylinder head.

- Fit on cylinder head, insert all 8 cylinder head bolts and tighten by hand.
- Screw the guide bolts out of the screw holes with a bolt tightener from -MP1-208 (3070)- and screw in the 2 remaining cylinder head screws.
- Tighten cylinder head screws in the order -1 ... 10- in 3 stages as follows:

Stage	Procedure
I	– Pre-tighten with the torque wrench to 30 Nm.
II	– Pre-tighten with the torque wrench to 50 Nm.
III	– Using a rigid wrench torque a further 180° (1/2 turn).

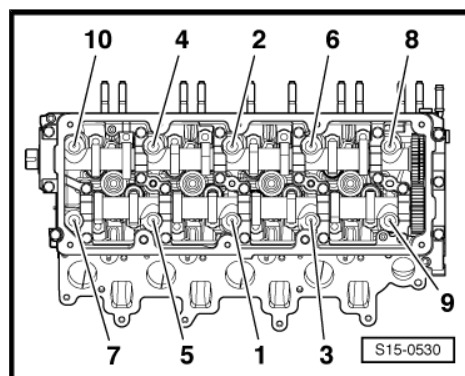
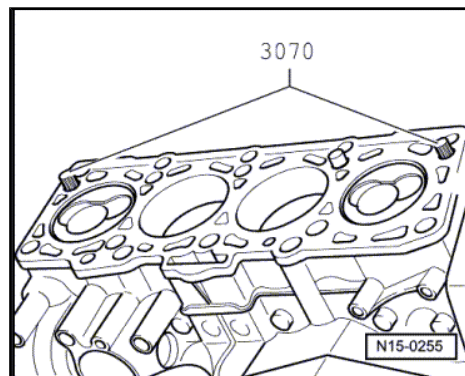


Note

Tightening up the cylinder head bolts after doing repair work is not necessary.

Further installation occurs in reverse order, while paying attention to the following:

- Attach rear toothed belt guard at cylinder head.
- Install the hub and the camshaft sprocket.
- Lock the camshaft and the high pressure pump with the rig pins for diesel injection pump -3359- .



- Rotate the crankshaft on TDC in direction of rotation of the engine, interlock with the crankshaft arrester -T10050- .
- Fit on the toothed belt ⇒ [page 38](#) .
- Install cylinder head cover ⇒ [page 66](#) .



Note

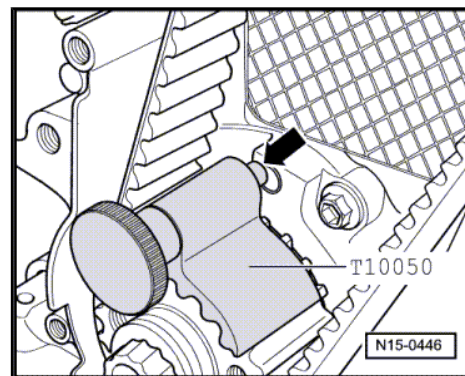
If the cylinder head was replaced, refill the entire system with coolant.

- Top up coolant ⇒ [page 115](#) .
- Perform a test drive, interrogate fault memory of engine control unit and erase ⇒ Vehicle diagnostic, testing and information system VAS 5051.



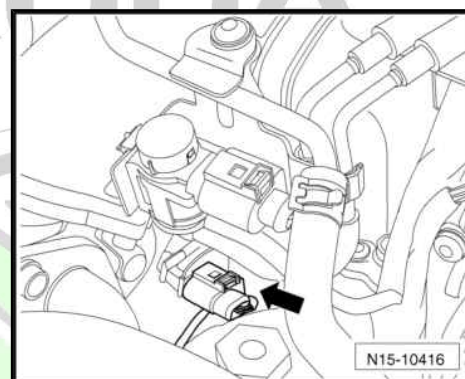
Note

After deleting the fault memory of the engine control unit the readiness code must be checked, if necessary re-generated ⇒ Vehicle diagnostic, testing and information system VAS 5051.

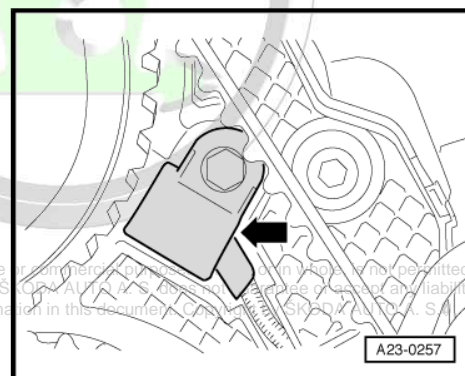


1.5 Removing and installing Hall sender - G40-

- Remove engine cover ⇒ [page 7](#) .
- Removing toothed belt ⇒ [page 33](#) .
- Disconnect plug from Hall sender -G40- -arrow-.
- Disconnect the plug from its bracket.



- Unscrew Hall sender -G40- -arrow-.



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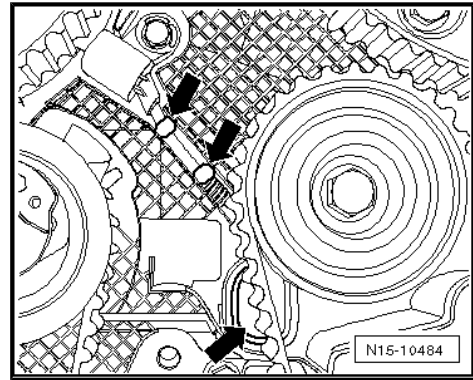


- Remove the lands and the cover of the repair opening -arrows- using a screwdriver.
- Unscrew the Hall sender -G40- from the cylinder head and guide its plug through the repair hole in the toothed belt guard.

Install

Installation is carried out in the reverse order. Pay attention to the following:

- ♦ Close the repair opening in the toothed belt guard with a rubber plug ⇒ Electronic Catalogue of Original Parts .
- install toothed belt and set the timing ⇒ [page 38](#) .



1.6 Removing and installing the vacuum pump

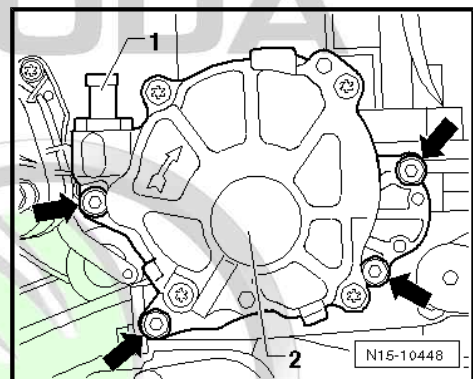


WARNING

The vacuum pump must on no account be disassembled, otherwise the proper operation of the pump vacuum part is no longer assured. This will result in a failure of the brake booster.

Removing

- Remove air filter ⇒ [page 214](#) .
- Detach the vacuum line to the brake servo unit from the nozzle -1- of the vacuum pump -2-.
- Release the fixing screws of the left charge air pipe, afterwards press the left charge air pipe slightly downwards in order to reach the rear fixing screw of the vacuum pump.



- Unscrew fixing screws -arrows-.
- Remove vacuum pump -2- from cylinder head.

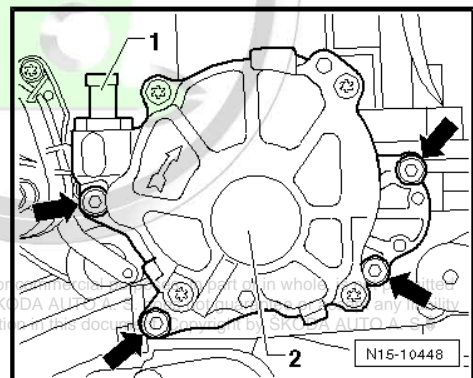
Install

Installation is performed in the reverse order, pay attention to the following points:



Note

- ♦ Pay attention to the correct position of the coupling for the vacuum pump in the camshaft.
- ♦ Always replace the vacuum pump seals.
- Install vacuum pumps and tighten fixing screws to 9 Nm.
- Connect the vacuum line of the brake servo unit to the nozzle -1- of the vacuum pump.



1.7 Testing the compression



Note

- ◆ A rough test of the compression pressure can be carried out in the targeted fault finding ⇒ Vehicle diagnostic, testing and information system VAS 5051.
- ◆ The following work sequence with the compression tester gives more precise values.

Special tools and workshop equipment required

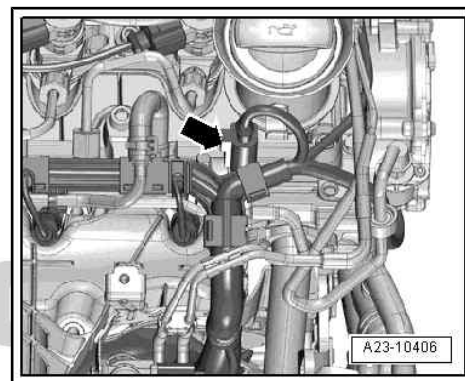
- ◆ Compression tester , e.g. -V.A.G 1763 -
- ◆ Adapter , e.g. -V.A.G 1381/12-
- ◆ Hinged wrench -3220-

Test condition

- Engine oil temperature at least 30 °C.

Test sequence

- Disconnect the plug -arrow- at the fuel pressure regulating valve -N276- .
- Remove the glow plug for the relevant cylinder with the hinged wrench -3220 - ⇒ [page 238](#) .
- Screw adapter -V.A.G 1381/12 - into the threaded hole of the glow plug.
- Check compression pressure using the compression tester - V.A.G 1763- .



Note

Use of tester ⇒ Operating Instructions .

- Operate starter until the tester no longer indicates a pressure rise.

Compression readings

New engine	Wear limit	Permissible difference between the cylinders
2.5...3.1 MPa	1.9 MPa	max. 0.5 MPa
25...31 bar	19 bar	max. 5 bar

Work procedure after the compression pressure test

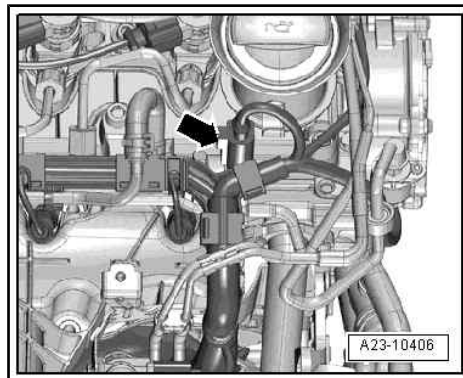
- Re-install the glow plug of the relevant cylinder ⇒ [page 238](#) .



- Connect the plug -arrow- to the fuel pressure regulating valve -N276- .
- Interrogating and erasing fault memory of engine control unit
⇒ Vehicle diagnostic, testing and information system VAS 5051.

**Note**

After deleting the fault memory of the engine control unit the readiness code must be re-generated.



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2 Valve gear

2.1 Summary of components



Note

- ◆ After installing the camshafts, the engine must not be cranked or started for about 30 minutes. The hydraulic clearance compensation elements must settle (otherwise the valves would strike the pistons).
- ◆ After carrying out work on the valve gear, carefully crank engine at least 2 revolutions to ensure that no valve touches the piston when the engine is started.
- ◆ Always replace gasket rings and seals.

1 - Valve

- ☐ do not rework, only grinding in is permissible
- ☐ mark the fitting position for re-installation
- ☐ Valve dimensions
⇒ [page 94](#)
- ☐ inspecting valve guides
⇒ [page 94](#)

2 - Cylinder head

- ☐ pay attention to the notes ⇒ [page 69](#)
- ☐ check for distortion
⇒ [page 71](#)
- ☐ removing and installing
⇒ [page 71](#)
- ☐ after replacing fill entire system with fresh coolant ⇒ [page 115](#)

3 - Valve stem seal

- ☐ replace ⇒ [page 91](#)

4 - Valve spring

5 - Valve spring retainer

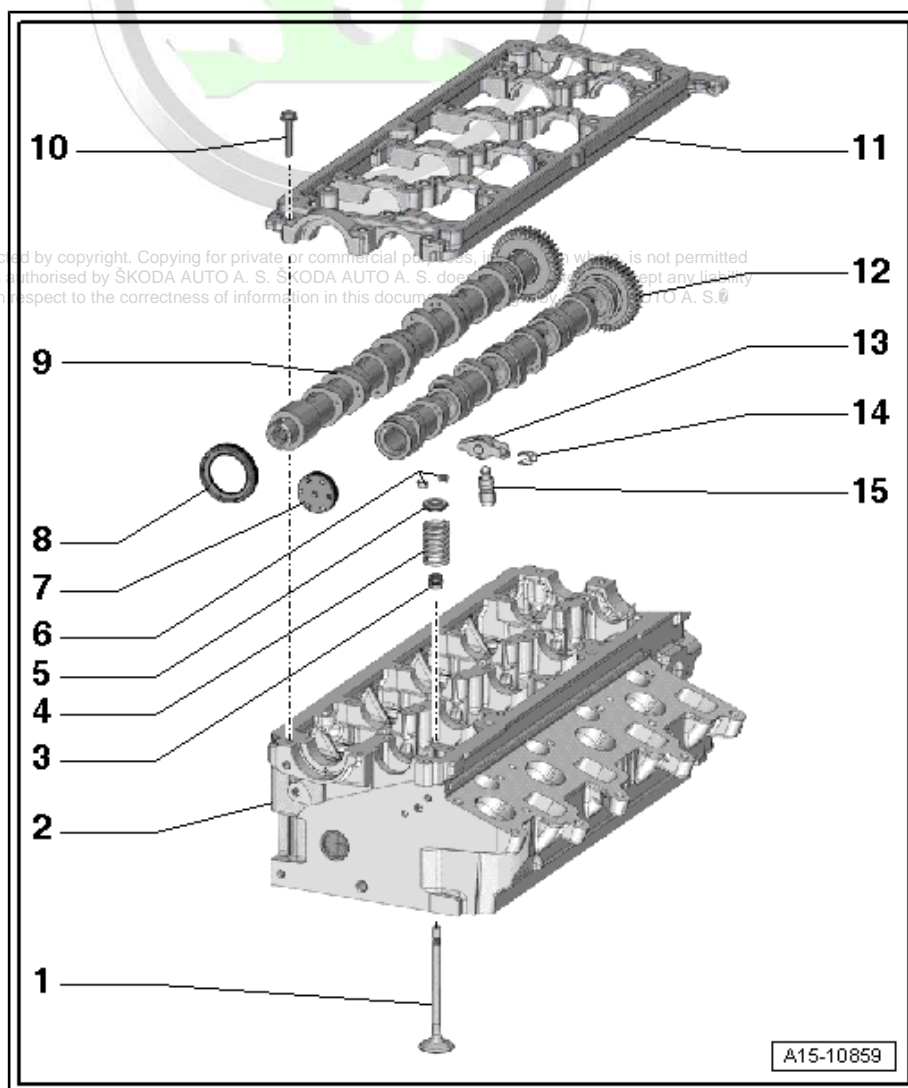
6 - Valve collets

7 - Screw cap

- ☐ replace
- ☐ removing: plunge into the installed bearing frame using a screw-driver and lever out
- ☐ installing: drive in without sealant using a suitable thrust piece until flush

8 - Sealing ring

- ☐ Do not additionally lubricate or grease sealing lip of the gasket ring
- ☐ Remove oil residue on the camshaft stud with a clean cloth
- ☐ before fitting, cover slot on the camshaft cone with adhesive tape (e.g. Scotch tape)
- ☐ removing and installing ⇒ [page 84](#)



**9 - Camshaft**

- ☐ for exhaust valves
- ☐ removing and installing ⇒ [page 85](#)
- ☐ Measure axial play ⇒ [page 89](#)

10 - 10 Nm

- ☐ order of tightening ⇒ [page 85](#)

11 - Bearing frame

- ☐ pay attention to sequence for loosening and tightening ⇒ [page 85](#)
- ☐ seal with silicone sealant -D 176 501 A1-

12 - Camshaft

- ☐ for inlet valves
- ☐ removing and installing ⇒ [page 85](#)
- ☐ Measure axial play ⇒ [page 89](#)

13 - Roller rocker arm

- ☐ Mark installation position
- ☐ do not interchange
- ☐ inspect roller bearings for smooth operation
- ☐ oil contact surfaces

14 - Locking clip

- ☐ check for firm seating
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15 - Hydraulic balancing element

- ☐ Mark installation position
- ☐ oil the contact surfaces before installing
- ☐ check ⇒ [page 90](#)

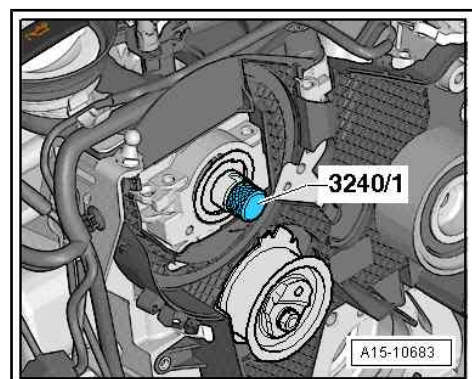
2.2 Replacing camshaft gasket ring

Special tools and workshop equipment required

- ◆ Insertion tool -MP1-214 (10-203)-
- ◆ Gasket ring extractor -T30003 (3240)-
- ◆ Screw M12 x 1.5 x 75 from the insertion tool -MP1-214 (10-203)-

Removing

- Pull toothed belt off camshaft sprocket and from toothed belt gear on the high pressure pump ⇒ [page 85](#) .
- Remove camshaft sprocket and hub ⇒ [page 85](#) .
- Insert thrust piece -3240/1- into the camshaft.
- Unscrew inner part of the gasket ring extractor -3240- two turns (approx. 3 mm) out of the outer part and lock with knurled screw.



- Oil the thread head of the gasket ring extractor, position and forcibly screw into the gasket ring as far as possible.
- Release knurled screw and turn the inner side against the camshaft until the gasket ring is pulled out.

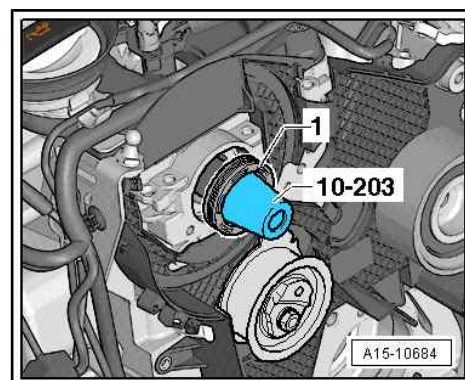
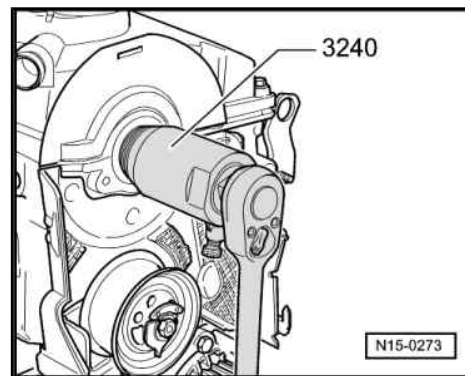
Install



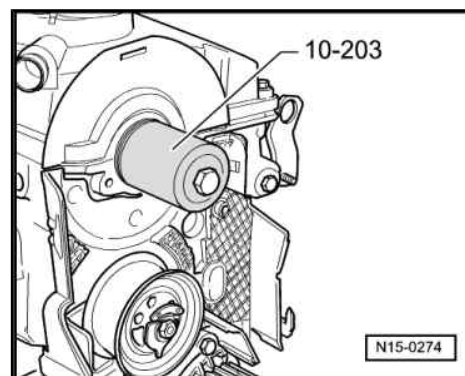
Note

The sealing lip of the new gasket ring must neither be oiled nor greased additionally.

- Fit the guide bushing from -MP1-214 (10-203)- onto the camshaft as shown in the illustration.
- Carefully slide the gasket ring -1- over the guide bushing onto the camshaft.



- Press in the gasket ring with the thrust piece of the insertion tool -MP1-214 (10-203)- and the screw M12 x 1.5 x 75 up to the stop.
- Install the hub and the camshaft sprocket ➔ [page 85](#) .
- Installing the timing belt ➔ [page 38](#) .



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2.3 Removing and installing camshafts

Special tools and workshop equipment required

- ◆ Counterholder -T10051 -
- ◆ Extractor -T10052-
- ◆ Camshaft-insertion tool -T40094-
- ◆ Camshaft-insertion tool -T40095-
- ◆ Tensioning tool -T40096/1-
- ◆ Silicone sealant -D 176 501 A1-
- ◆ Sealant remover gasket stripper (bearing code GST, bearing article no. R 34402), manufacturer Retech s.r.o.
- ◆ Cleaning and degreasing agent , e.g. -D 000 401 04-
- ◆ Protective goggles and gloves

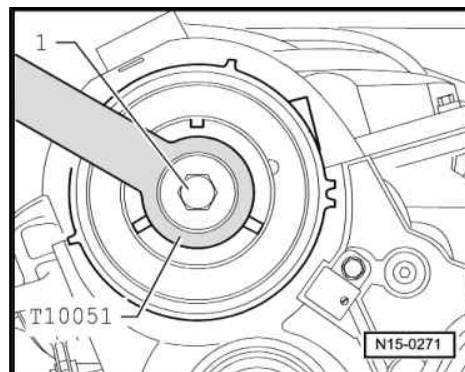
Removing

- Cylinder head fitted.

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- Pull toothed belt off camshaft sprocket and from toothed belt gear on the high pressure pump ➤ [page 33](#) .
- Remove cylinder head cover ➤ [page 66](#) .
- Remove camshaft sprocket.
- Slacken screw -1- for the hub of the camshaft, to do so counterhold with counterholder -T10051- .
- Release screw by about 2 turns.

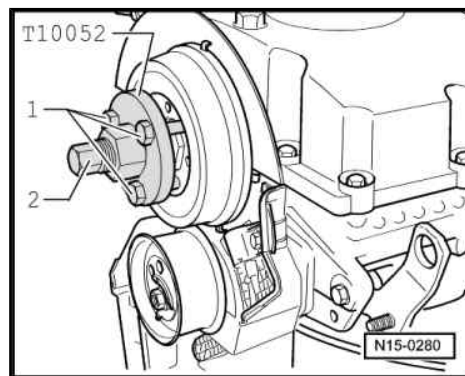


- Position the extractor -T10052- at the hub of the camshaft and screw the screws -1- into the hub.
- Slacken the hub of the toothed belt sprocket from the camshaft cone by uniformly tightening the screw of the extractor -2-.



Note

While doing so, hold the extractor firmly using a wrench SW 30.



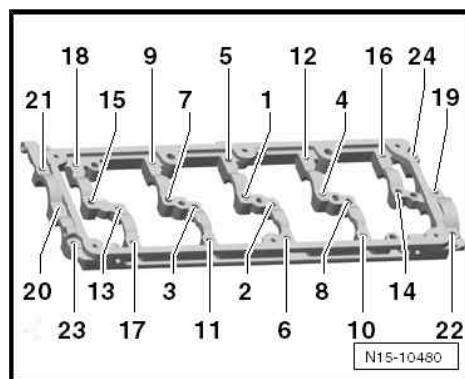
- Remove hub of toothed belt sprocket from cone of camshaft.
- Remove vacuum pump ➤ [page 80](#) .
- Release the bearing frame screws in the order -24...1-.
- Unscrew screws and carefully separate the bearing frame from the cylinder head.
- Mark the camshafts for reinstalling and remove.

Install



WARNING

Wear protective gloves and goggles when working with gasket remover and degreasing agent!



- Remove residual sealant on the bearing frame and cylinder head using a chemical sealant remover.
- Clean sealing surfaces, they must be free of oil and grease.
- Oil contact surfaces of camshafts.



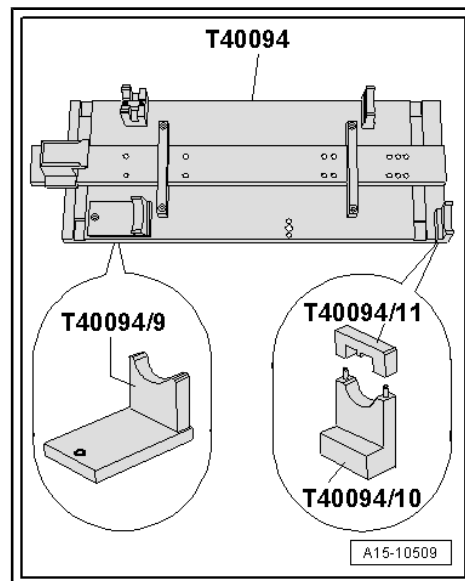
Caution

The camshafts must only be installed using the camshaft-insertion tool -T40094- as described in the following, otherwise the axial bearing in the bearing frame can be destroyed and the cylinder head must be replaced.

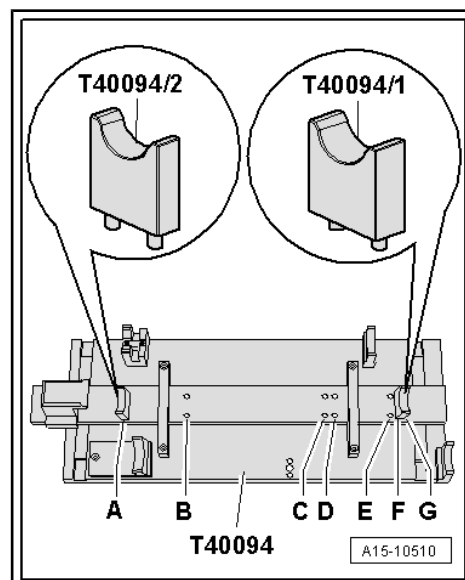
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Set up the camshaft-insertion tool -T40094- as follows:

- Tighten the support bearing -T40094/9- and -T40094/10- (with the bearing bracket -T40094/11-) to the boundary points of the base plate, as shown in the illustration. If necessary, remove any other support bearings screwed on these points.

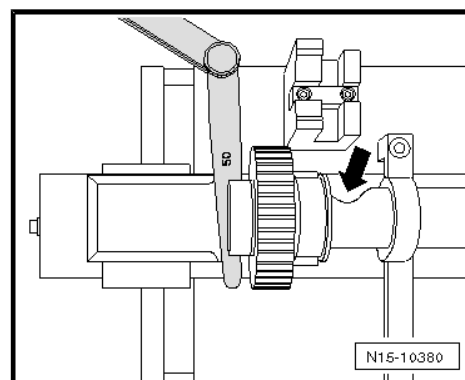


- Position the support -T40094/1- onto the plug location -F- and the support -T40094/2- onto the plug location -A-.
- Insert the inlet camshaft in the supports -T40094/1- and -T40094/2- .



The protrusion -arrow- of the cylinder head bolt must point to the outside.

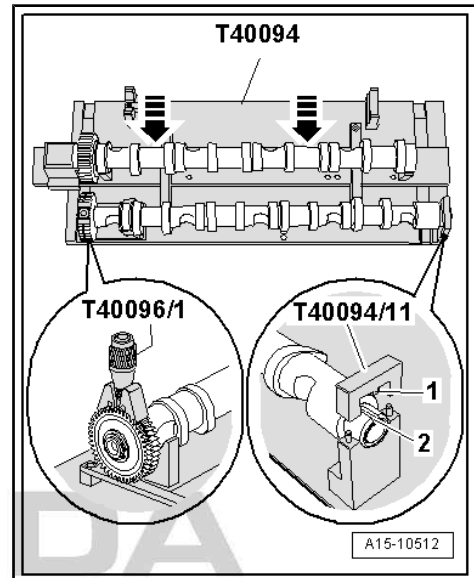
- Fit on a feeler gauge of 0.50 mm and slide the support -T40094/8- into the groove of the inlet camshaft.



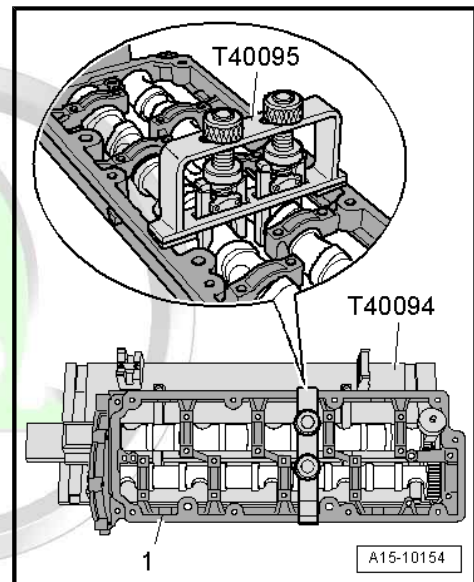
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- Insert the outlet camshaft in the supports -T40094/9- and -T40094/11- and lock with serration of detent bracket -T40094/11-
- The serration -1- of the detent bracket must engage into the groove -2- in the outlet camshaft.
- Position the tensioning tool -T40096/1- on the pinions of the outlet camshaft in such a way that each clamping arm engages in a pinion.
- The wider clamping arm must engage in the wider pinion.
- Tension the tensioning tool -T40096/1- with the knurled wheel until the tooth flanks of both wheels are aligned.
- Slide the inlet camshaft -arrows- to the outlet camshaft until the serrations engage.



- Position the bearing frames onto the camshafts.
- All of the camshaft bearings must rest on the camshafts.
- Position the camshaft-insertion tool -T40095-, as shown in the figure, and fix the camshafts in the bearing frame.
- Remove the locking bracket -T40094/11- and pull the support -T40094/8- out of the groove of the inlet camshaft.

**Note**

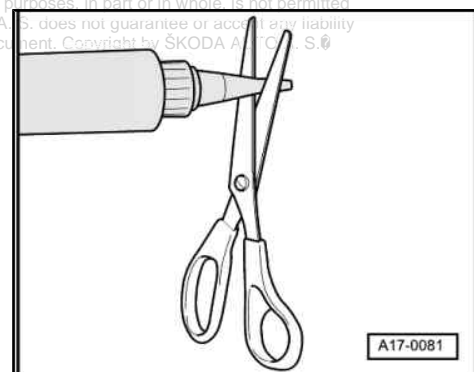
Pay attention to the use by date on the silicone sealant.

- Cut off nozzle tube at the front marking (\varnothing of nozzle approx. 2 mm).

**Caution**

Risk of contamination of the camshaft bearings through excess sealant.

- ◆ ***The sealant bead must not be thicker than specified.***



- Apply sealant onto the clean sealing surface of the cylinder head as shown in the illustration.
- Thickness of the sealant beads: 2...3 mm
- The oil duct for the bearing frame -arrow- must not be clogged with excess sealant.



Note

The bearing frame with camshafts must be installed within 5 minutes after applying the silicone sealant.

- Remove the camshafts together with the bearing frame, the camshaft-insertion tool -T40095- and the tensioning tool -T40096/1- from the camshaft-insertion tool -T40094- and carefully insert into the bearings in the cylinder head.

- Insert the screws of the bearing frame and first tighten in the sequence -1 ... 24- by hand.
- The bearing frame must rest on the cylinder head with its complete contact surface.
- Tighten the screws of the bearing frame in the sequence -1...24-.

Tightening torque: 10 Nm

- Remove the camshaft-insertion tool -T40095- and the tensioning tool -T40096/1- .

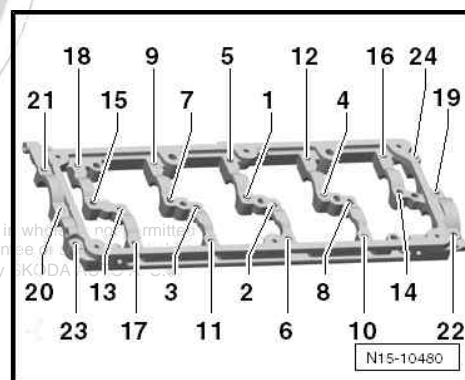
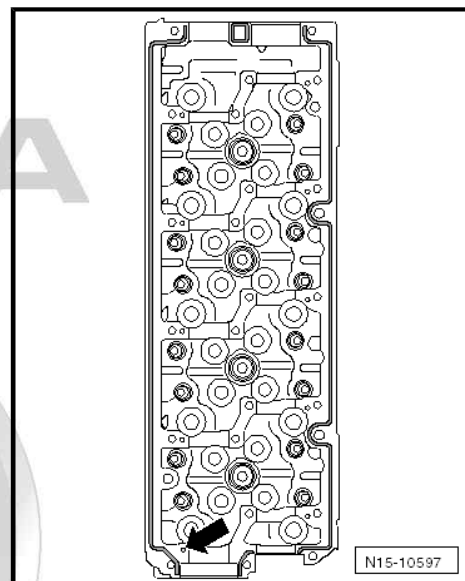
The further assembly is carried out in the reverse order, while paying attention to the following:

- Replacing camshaft gasket ring ⇒ [page 84](#) .
- Drive in new screw cap ⇒ [Item 7 \(page 83\)](#) .
- Install vacuum pump ⇒ [page 80](#) .
- Install cylinder head cover ⇒ [page 66](#) .



Note

- ◆ *After installing the camshafts, the engine must not be cranked or started for about 30 minutes. The hydraulic clearance compensation elements must settle (otherwise the valves would strike the pistons).*
- ◆ *After carrying out work on the valve gear, carefully crank engine at least 2 revolutions to ensure that no valve touches the piston when the engine is started.*



2.4 Measuring the axial play of the camshafts

Special tools and workshop equipment required

- ◆ Universal dial gauge holder -MP3-447 (VW 387)-
- ◆ Dial gauge , e.g. -VAS 6079-

Work procedure

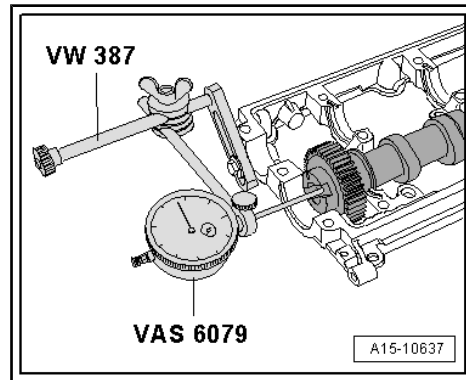
- Remove bearing frame ⇒ [page 85](#) .



- Attach the dial gauge with the universal dial gauge holder - MP3-447 (VW 387)- to the bearing frame as shown in the illustration.
- Press the camshaft by hand against the dial gauge.
- Position dial gauge to „0“.
- Press the camshaft off the dial gauge and read the value.

Axial play of inlet camshaft and outlet camshaft:

- Wear limit 0.17 mm



2.5 Checking hydraulic balancing elements



Note

- ◆ *The hydraulic balancing elements cannot be repaired.*
- ◆ *Irregular valve noises when starting engine are normal.*
- ◆ *If the irregular valve noises disappear but occur regularly during short journeys, then the oil pressure must be checked*
⇒ [page 108](#) .
- ◆ *The valve for oil pressure control is integrated in the oil pump.*

Special tools and workshop equipment required

- ◆ Feeler gauge

Work procedure

- Start engine and allow to run until the radiator fan starts.
- Increase speed to about 2500 rpm for 2 minutes and undertake a test drive if necessary.

If the valve noises occur irregularly, determine the defective hydraulic balancing element as follows:

- Remove cylinder head cover ⇒ [page 66](#) .
- Turn the crankshaft until the cam of the hydraulic balancing element to be tested is positioned on top.

- Press down the hydraulic balancing element using a wooden or plastic wedge.
- Determine the play between the cam and the roller of the valve lever.

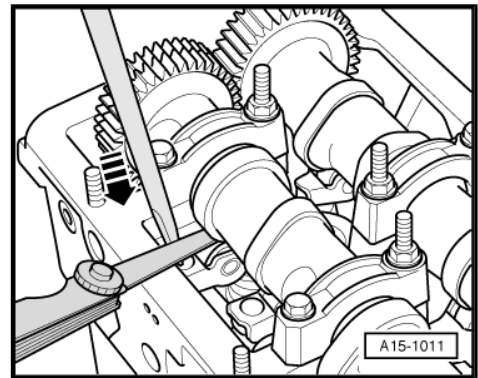
If a 0.20 mm feeler gauge can be slipped between the cam and the roller of the valve lever, the hydraulic balancing element is defective:

- Replace the hydraulic balancing element. To do so, remove camshafts ➔ [page 85](#) .



Note

- ◆ *After installing the camshafts, the engine must not be started for about 30 minutes. The hydraulic clearance compensation elements must settle (otherwise valves would strike the pistons).*
- ◆ *After carrying out work on the valve gear, carefully crank engine at least 2 revolutions to ensure that no valve touches the piston when the engine is started.*



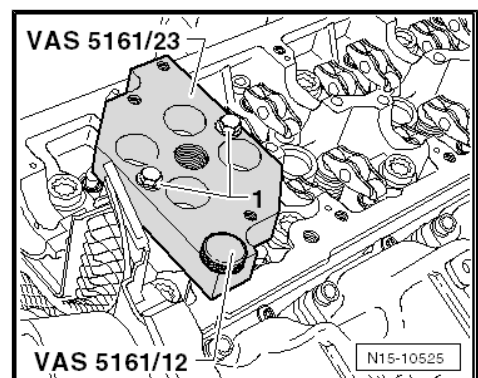
2.6 Replacing valve stem seals

Special tools and workshop equipment required

- ◆ Valve stem seal extractor -MP1-230 (3364)-
- ◆ Valve stem seal insertion tool -MP 1-233 (3365)-
- ◆ Disassembly and assembly device for valve collets -VAS 5161- with knurled spacer ring -VAS 5161/23-1- and guide plate -VAS 5161/23-
- ◆ Screw M6 x 30 (2 pieces)

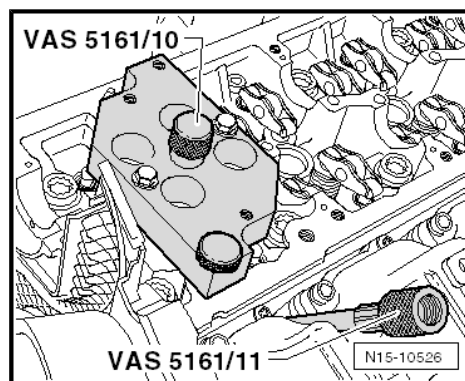
Work procedure

- Remove all glow plugs ➔ [page 238](#) .
- Remove the camshafts ➔ [page 85](#) .
- When installing again, mark the assignment of the roller rocker arms and the hydraulic clearance compensation elements.
- Remove the roller rocker arms together with the hydraulic balancing elements and lay aside on a clean surface.
- Put the piston of the relevant cylinder at „bottom dead centre“.
- Position the guide plate -VAS 5161/23 - onto the cylinder head.
- Screw the guide plate at the side of the intake manifold with the knurled screw -VAS 5161/12- to the cylinder head and with 2 screws M6 x 30 -1- by hand until it fits on tightly.

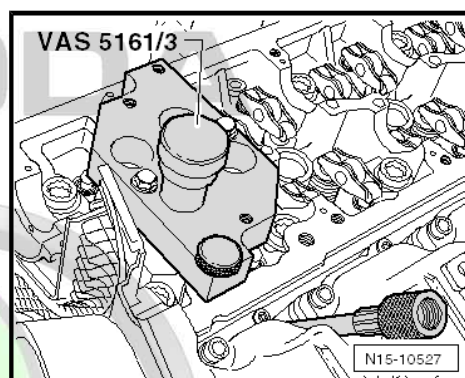




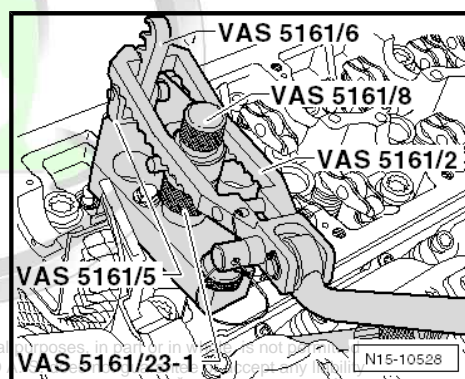
- Screw the sealing bolt -VAS 5161/10- into the guide plate.
- Screw adapter -VAS 5161/11 - into the threaded hole of the glow plug by hand.



- Insert the impact drift -VAS 5161/3 - into the guide plate and slacken the tightly fitted valve collets using a plastic hammer.

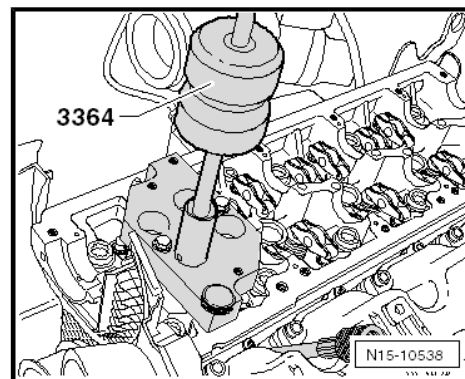


- Screw the detent part -VAS 5161/6- and the interlocking fork -VAS 5161/5- into the guide plate.
- Slide the knurled spacer ring -VAS 5161/23-1- onto the assembly cartridge -VAS 5161/8- .
- Connect the adapter -VAS 5161/11 - to the compressed air with a commercially available intermediate piece and apply constant pressure.

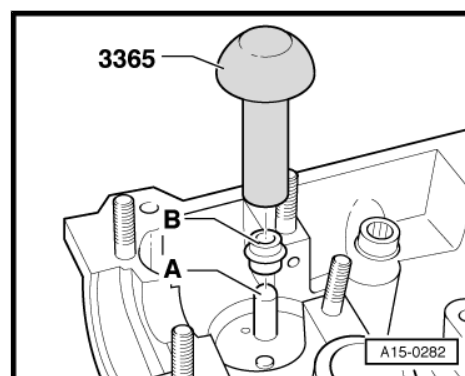


- Minimum pressure: 0.6 MPa (6 bar)
- Hook the pressure fork -VAS 5161/2 - onto the detent part and push the assembly cartridge downwards.
- Turn simultaneously the knurled screw of the assembly cartridge to the right, until the tips click into the valve collets.
- Rotate the knurled screw to the left and to the right, by doing so the valve collets are pressed apart and are installed in the assembly cartridge.
- Release the pressure fork.
- Remove the assembly cartridge with the knurled spacer ring.
- Remove the valve spring with the valve spring retainer.

- Pull off valve stem seal with extractor for valve stem seal -3364- .

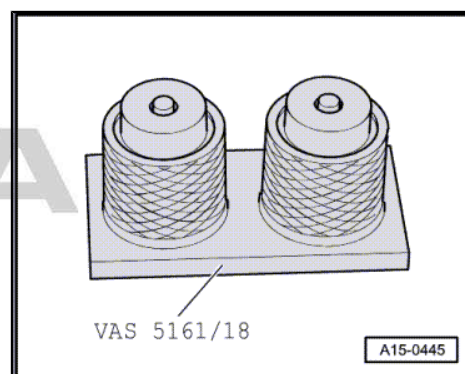


- Fit the plastic protective sleeve -A-, which is attached to the new valve stem seals -B-, onto the valve stem.
- Lightly oil sealing lip of the new valve stem seal.
- Slide the valve stem seal onto the plastic bushing.
- Carefully press the valve stem seal with the valve stem seal insertion tool -3365 - onto the valve guide.
- Remove plastic sleeve.



If the valve collets were removed from the assembly cartridge, first of all they must be inserted into the device -VAS 5161/18- .

- The large diameter of the valve collets points to the top.
- Insert the valve spring and the valve spring retainer.
- Press assembly cartridge -VAS 5161/8- from the top onto the disassembly and assembly device -VAS 5161/18- and lift up the valve collets.

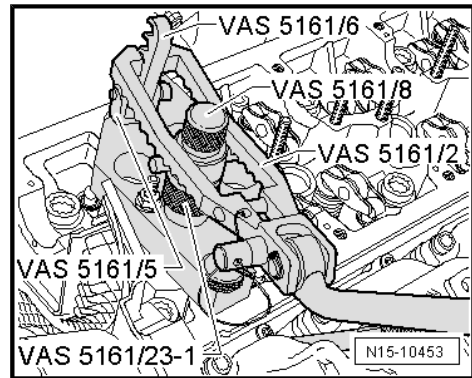




- Re-insert the assembly cartridge into the guide plate - VAS 5161/23- .
- Press down the pressure fork and turn the knurled screw to the left and to the right while pulling it upwards, by doing so the valve collets are inserted.
- Release the pressure fork on tightened knurled screw.
- Repeat the procedure for each valve.

Assembling together

Installation is performed in the reverse order, pay attention to the following points:



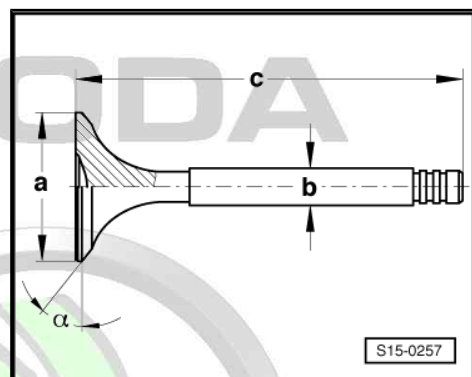
Note

Ensure that all the roller arms are correctly positioned on the valve stem ends and are clipped in place on the relevant hydraulic balancing elements.

- Install camshafts ➔ [page 85](#) .
- Install glow plugs ➔ [page 238](#) .

2.7 Valve dimensions

Dimension		Inlet valve	Exhaust valve
Ø a	mm	26,6	26,0
Ø b	mm	5,975	5,965
c	mm	99,3	99,1
α	°	45	45



Note

Valves must not be reworked. Only grinding in is permissible.

2.8 Inspect valve guides

Special tools and workshop equipment required

- ♦ Universal dial gauge holder -MP3-447 (VW 387)-
- ♦ Dial gauge , e.g. -VAS 6079-

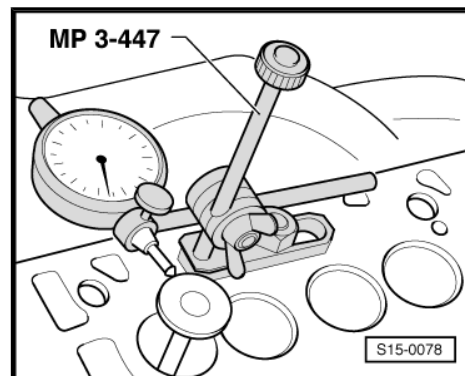
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Test sequence



Note

- ◆ *If the valves are replaced when carrying out repair work, use new valves for the measurement.*
- ◆ *Because of the different stem diameters only use inlet valve in inlet guide or outlet valve in outlet guide.*
- Insert valve into valve guide. The end of valve stem must be flush with guide.
- Valve rock: max. 1.3 mm



Note

If the wear limit is exceeded, repeat measurement with new valves. If the wear limit is again exceeded, replace cylinder head. The valve guides cannot be replaced.

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- ☐ with safety valve 1.0 MPa (10.0 bar)
- ☐ removing and installing ⇒ [page 106](#)
- ☐ before installing, check whether both dowel sleeves are present
- ☐ if there is any scoring on the contact surfaces of the gears, replace
- ☐ Tightening torque of oil pump cover at oil pump housing: 10 Nm

If the toothed belt or the oil pump must be removed:

- ◆ Check smooth operation of oil pump:
- ◆ It must be possible to easily turn the toothed belt sprocket with the finger
- ◆ if the oil pump is sluggish, it must be replaced
 - ☐ removing and installing ⇒ [page 106](#)

12 - Intake manifold

- ☐ Clean strainer if dirty

13 - Baffle

14 - 15 Nm

15 - 15 Nm

16 - Oil pan

- ☐ removing and installing ⇒ [page 103](#)
- ☐ install with silicone sealant -D 176 404 A2-

17 - 15 Nm

18 - Drain plug, 30 Nm

- ☐ with integrated gasket ring
- ☐ replace

19 - 10 Nm

- ☐ replace

20 - Oil level and oil temperature sender -G266-

- ☐ check ⇒ Vehicle diagnostic, testing and information system VAS 5051
- ☐ removing and installing ⇒ [page 97](#)

21 - O-ring

- ☐ replace

22 - Line

- ☐ to oil level and temperature sender

23 - Pressure valve, 27 Nm

- ☐ opens at 0.25..0.32 MPa (2.5..3.2 bar) overpressure
- ☐ replace without sealant
- ☐ removing and installing ⇒ [page 58](#)

24 - Oil injection nozzle

- ☐ for piston cooling
- ☐ removing and installing ⇒ [page 58](#)

1.2 Removing and installing oil level and oil temperature sender -G266-

Removing

- Drain engine oil ⇒ Maintenance ; Booklet Octavia II .

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- Disconnect plug connection -3-.
- Unscrew screw -1- and remove oil level and oil temperature sender -G266- -4-.

Install

Installation is performed in the reverse order, pay attention to the following points:

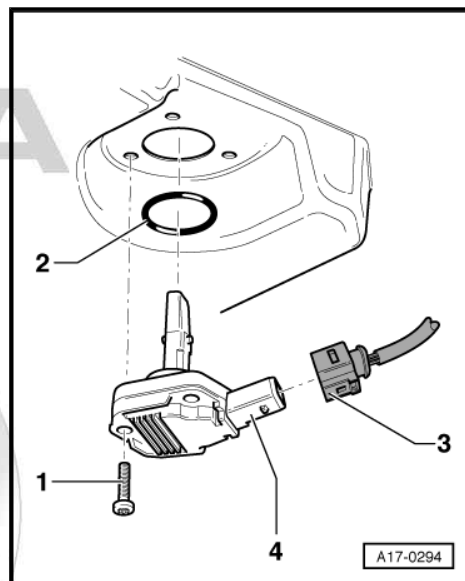
- Tightening torque ⇒ [Item 19 \(page 97\)](#) .



Note

Replace gasket ring -2- and screws -1-.

- Top up with engine oil and check the oil level ⇒ Maintenance ; Booklet Octavia II .



1.3 Oil filter with engine oil cooler - Summary of components

1 - Screw cap, 25 Nm

- ☐ with hexagon 32 mm

2 - O-ring

- ☐ replace

3 - O-ring

- ☐ replace

4 - O-ring

- ☐ replace

5 - Oil filter element

- ☐ remove from the cap
⇒ [Item 1 \(page 98\)](#)
- ☐ replace O-rings
⇒ [Item 2 \(page 98\)](#) ,
⇒ [Item 3 \(page 98\)](#) and
⇒ [Item 4 \(page 98\)](#) when
replacing the oil filter element
- ☐ Check fitting position
- ☐ pay attention to change
intervals ⇒ Maintenance ; Booklet Octavia II

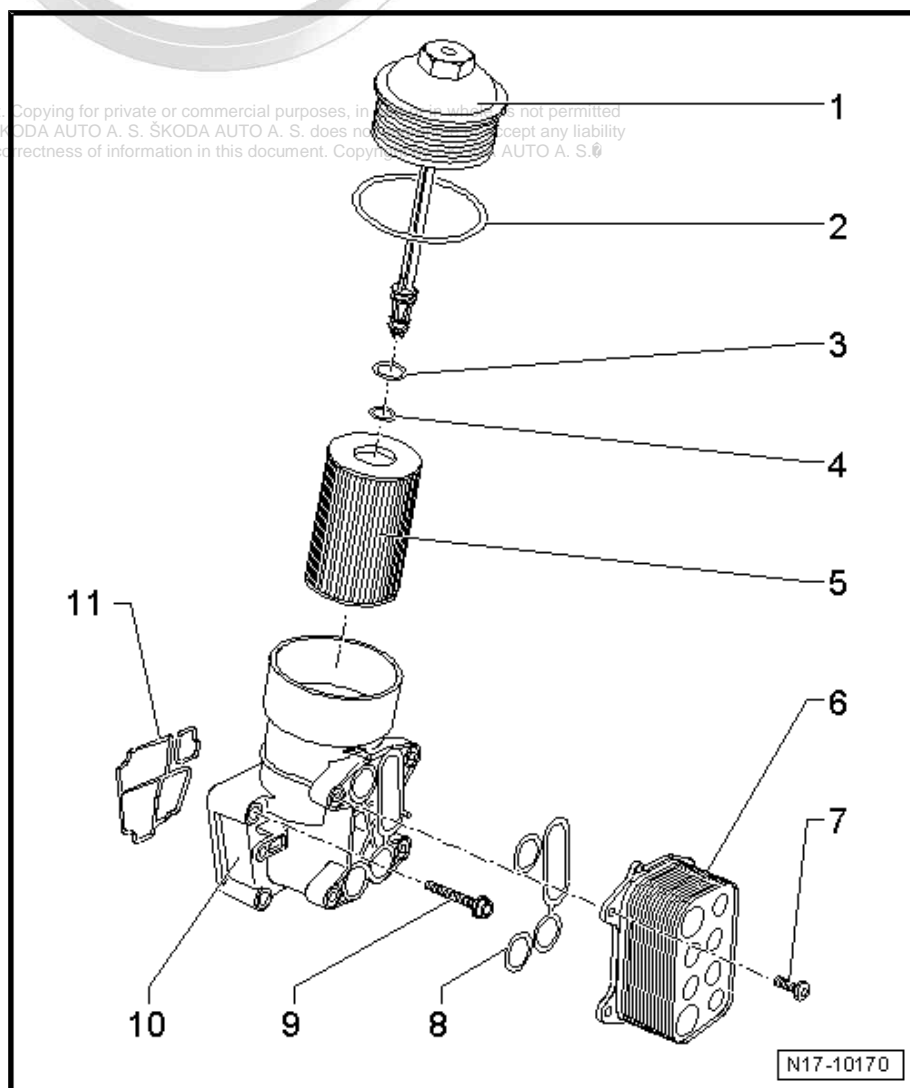
6 - Engine oil cooler

- ☐ with connection of oil
and coolant circuit via oil
filter holder
- ☐ removing and installing
⇒ [page 101](#)

7 - 11 Nm

- ☐ gradually tighten cross-
wise:

- ◆ 1. Stage: only by hand
- ◆ 2. Stage: 5 Nm



◆ 3. Stage: 11 Nm

8 - Gasket

- ☐ to engine oil cooler
- ☐ replace

9 - 14 Nm + torque a further 90° (1/4 turn)

- ☐ replace
- ☐ tighten crosswise

10 - Oil filter holder

- ☐ with integrated connection to the engine lubrication and cooling system for the engine oil cooler
- ☐ removing and installing ⇒ [page 99](#)

11 - Gasket

- ☐ to cylinder block
- ☐ replace



Note

- ◆ *The oil pressure switch -F1- is located on the cylinder head. Therefore it is listed in the summary of components ⇒ [page 69](#) .*
- ◆ *Remove and install oil pressure switch -F1- ⇒ [page 107](#) .*
- ◆ *Test oil pressure switch -F1- ⇒ [page 108](#) .*

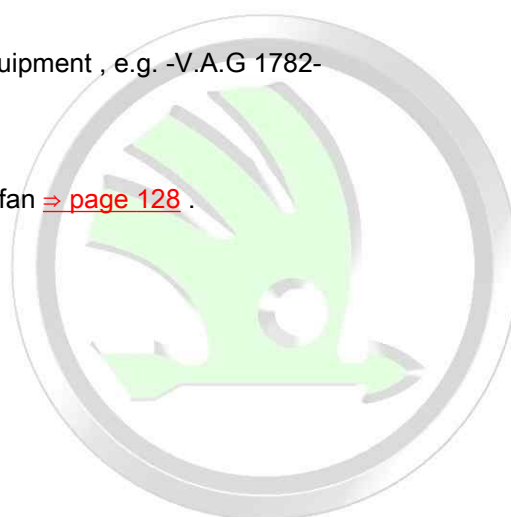
1.4 Removing and installing the oil filter holder with the engine oil cooler

Special tools and workshop equipment required

- ◆ Assembly device -T10118-
- ◆ Removal tool for inner lining of the door panel -MP8-602/1-
- ◆ Catch pan e.g. -VAS 6208-
- ◆ Old oil collecting and suction equipment , e.g. -V.A.G 1782-

Removing

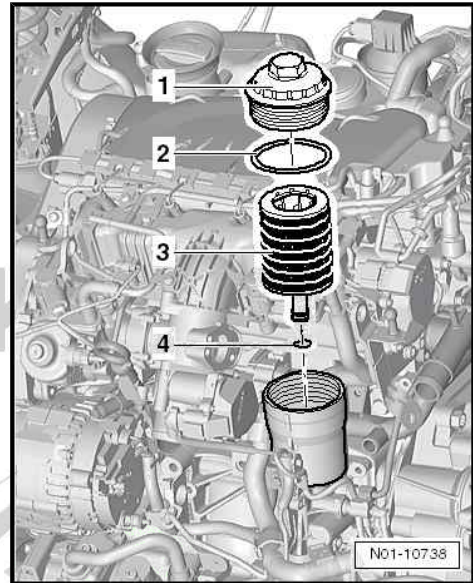
- Drain coolant ⇒ [page 115](#) .
- Remove fan shroud for radiator fan ⇒ [page 128](#) .
- Remove air filter ⇒ [page 214](#) .



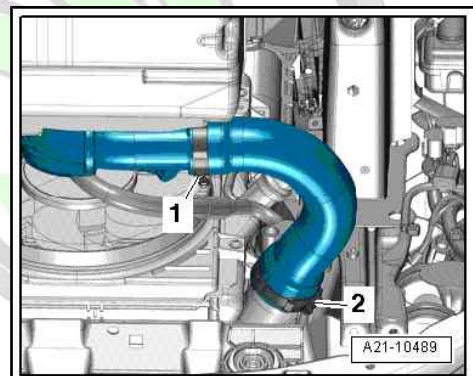
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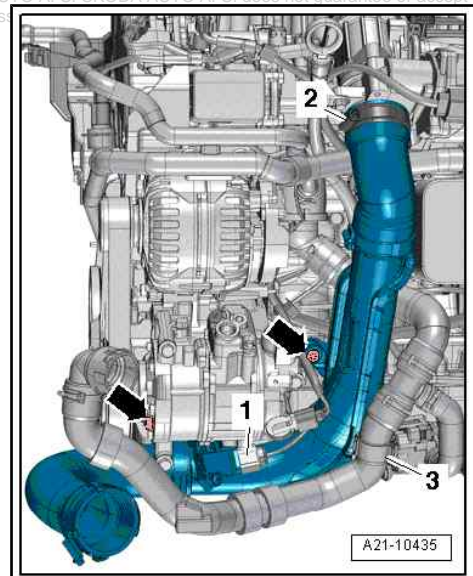
- Remove oil filter insert -3- ⇒ Maintenance ; Booklet Octavia II .



- Remove the charge air hose, to do so slacken the hose clamps -1- and -2-.

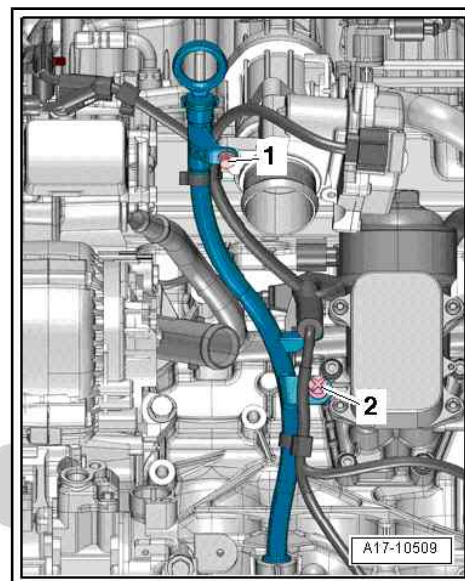


- Release screws -arrows-.
- Expose coolant hose -3-.
- Loosen hose clamp -2-.
- Disconnect the plug -1- at the charge pressure sender -G31- / intake air temperature sender -G42- and remove the right charge air pipe.

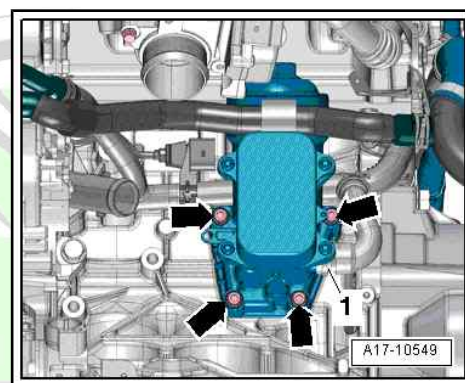


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- Slightly pull out oil dipstick, unscrew screw -1-.
- Press off clip -2- with removal tool -MP8-602/1- .
- Pull out the oil dipstick guide pipe upwards out of the cylinder block and push it to the side.
- Position the catch pan , e.g. -VAS 6208- , under the engine.



- Slacken hose clamp -1- and detach the coolant return hose from the oil filter holder.
- Place an old oil collecting and suction equipment -V.A.G 1782- under the engine.
- Screw out screws -arrows- and remove oil filter holder and engine oil cooler.



Install

Installation is performed in the reverse order, pay attention to the following points:

Note

- ◆ Replace all the gaskets and O-rings.
- ◆ Hose connections as well as charge air pipes and charge air hoses must be free of oil and grease before being installed.
- ◆ Secure all hose connections with screw clamps ➔ [page 177](#)

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Tightening torques: ➔ [page 98](#)

- Install oil filter insert, fill with engine oil and check the oil level
➔ Maintenance ; Booklet Octavia II .
- Top up coolant ➔ [page 115](#) .

1.5 Removing and installing engine oil cooler

Special tools and workshop equipment required

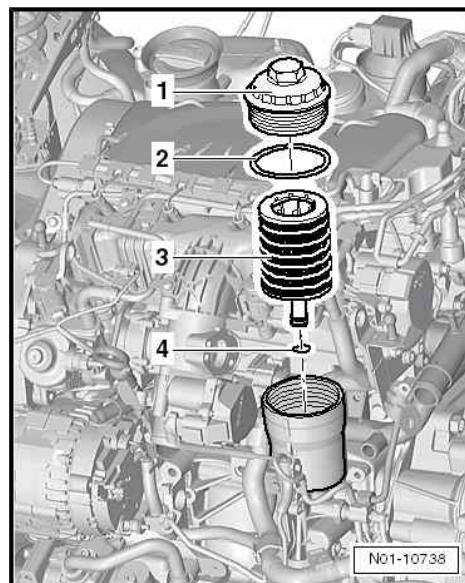
- ◆ Catch pan e.g. -VAS 6208-
- ◆ Old oil collecting and suction equipment , e.g. -V.A.G 1782-

Removing

- Drain coolant ➔ [page 115](#) .
- Remove air filter ➔ [page 214](#) .



- Remove oil filter insert -3-.



- Release screws -arrows-.
- Remove engine oil cooler from holder.

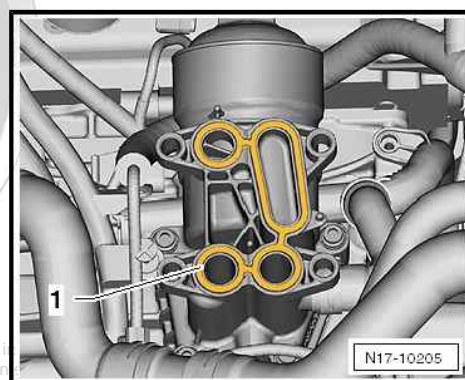
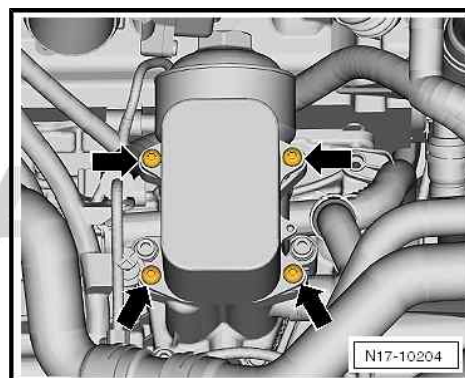
Install

Installation is performed in the reverse order, pay attention to the following points:



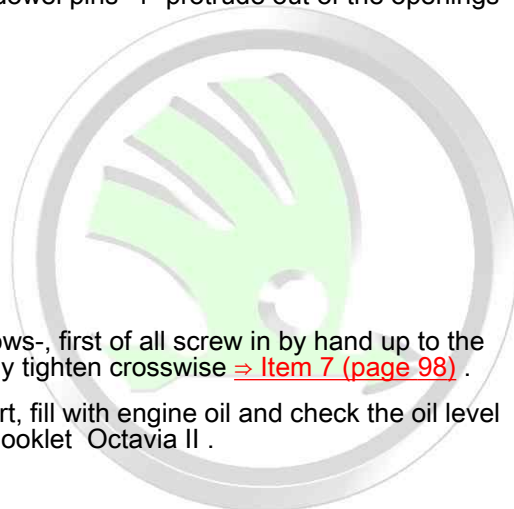
Note

- ◆ Replace all the gaskets and O-rings.
- ◆ Hose connections as well as charge air pipes and charge air hoses must be free of oil and grease before being installed.
- ◆ Observe the mounting sequence for hose connections with screw clamps ➔ [page 177](#) .
- Insert new gasket -1- ➔ [Item 8 \(page 99\)](#) in the guides at the oil filter holder.
- Carefully position the engine oil cooler onto the dowel sleeves.



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- Press in the engine oil cooler at the flange of the oil filter holder in such a way that it rests on the complete surface and the extremities of the dowel pins -1- protrude out of the openings of the guide.



- Insert screws -arrows-, first of all screw in by hand up to the stop, then gradually tighten crosswise ➔ [Item 7 \(page 98\)](#) .
- Install oil filter insert, fill with engine oil and check the oil level ➔ Maintenance ; Booklet Octavia II .

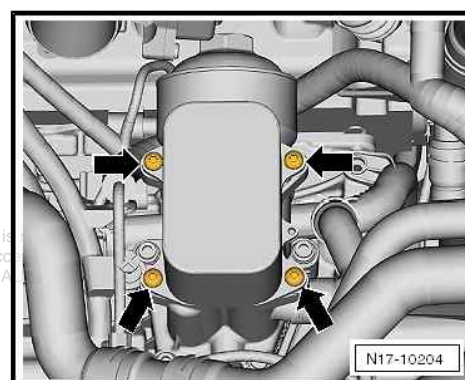
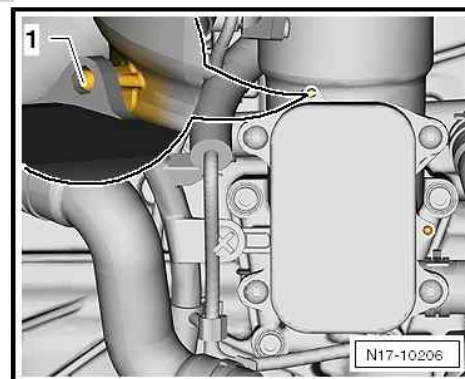


Note

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If the engine oil cooler was replaced, refill the entire system with coolant.

- Top up with coolant, if necessary replace ➔ [page 115](#) .



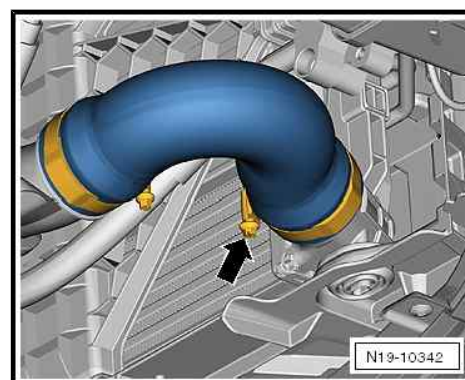
1.6 Removing and installing oil pan

Special tools and workshop equipment required

- ◆ Socket insert -T10058-
- ◆ Old oil collecting and suction equipment , e.g. -V.A.G 1782-
- ◆ Silicone sealant -D 176 404 A2-
- ◆ Sealant remover gasket stripper (bearing code GST, bearing article no. R 34402), manufacturer Retech s.r.o.
- ◆ Cleaning and degreasing agent , e.g. -D 000 401 04-
- ◆ Protective goggles and gloves

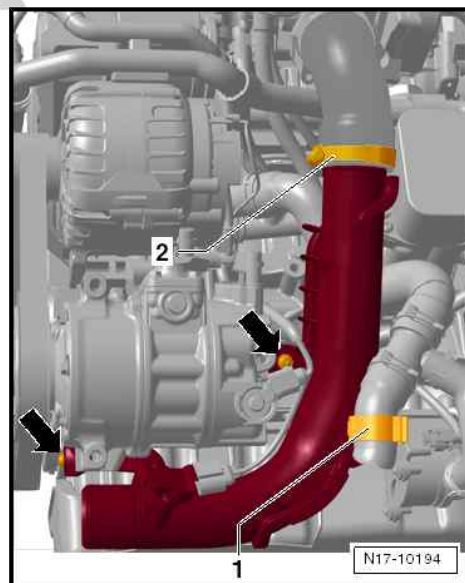
Removing

- Remove noise insulation ➔ Body Work ➔ Rep. gr. 50 .
- Remove the right wheelhouse liner bottom part ➔ Body Work ➔ Rep. gr. 66 .
- Remove right charge air hose.

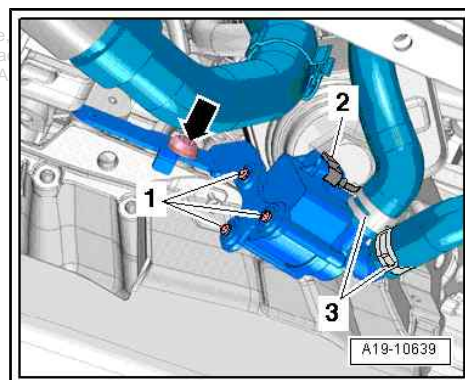




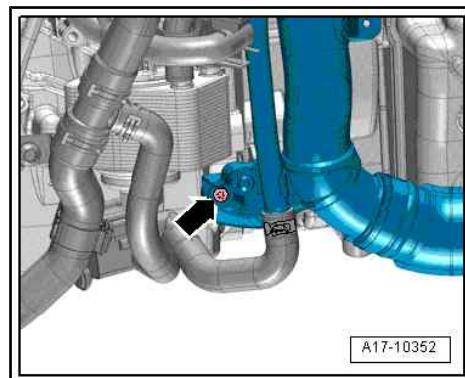
- Unscrew screws -arrows-, push the right charge air pipe slightly to the side and secure.



- Unscrew screw -arrow- and push the coolant recirculation pump 2 -V178- to the side.



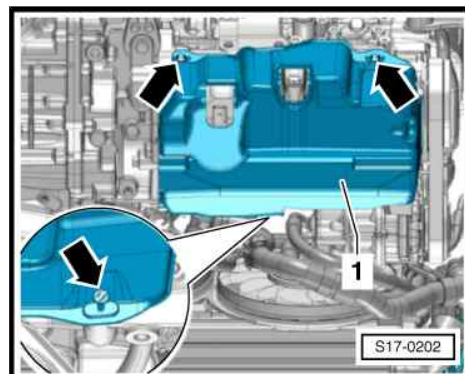
- Unscrew screw -arrow- on the left charge air pipe.
- Disconnect plug from oil level and oil temperature sender - G266- .



- Remove noise insulation of oil pan, to do so slacken the fixing parts -arrows-.

Front: 1x clip, 2-part
Rear: 2x screw clip, 2-part

- Suction off engine oil -V.A.G 1782- with old oil collecting and suction equipment ➔ Maintenance ; Booklet Octavia II .



- Unscrew connecting screws of oil pan/gearbox -arrows-.
- Loosen bolts -1...20- crosswise and release.
- Remove oil pan, if necessary release by applying slight blows with a rubber-headed hammer.

Install

Installation is performed in the reverse order, pay attention to the following points:



WARNING

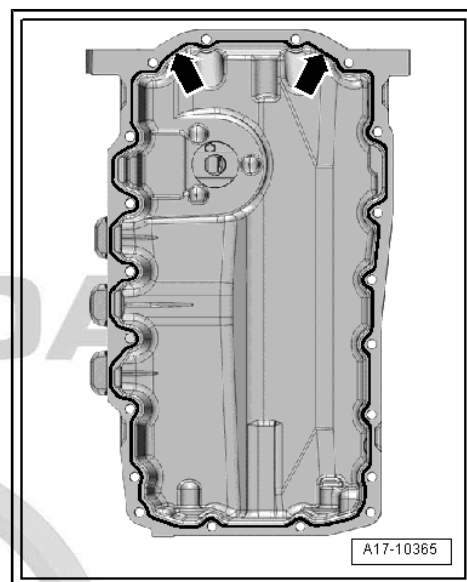
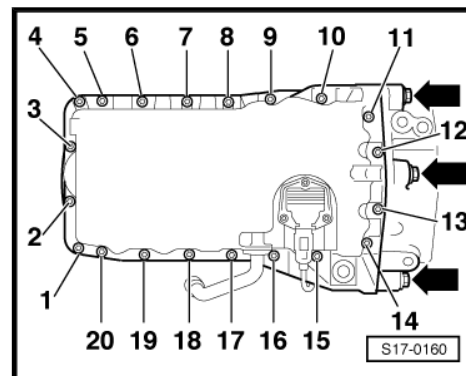
Wear protective gloves and goggles when working with gasket remover and degreasing agent!

- Remove residual sealant from the sealing surfaces on the cylinder block and on the oil pan with chemical sealant remover.
- Degrease the sealing surfaces.
- Cut off nozzle tube at the front marking (Ø of nozzle approx. 3 mm).
- Apply silicone sealant -D 176 404 A2- to the clean sealing surface of the oil pan, as shown -arrows-.
- Thickness of sealant bead: 2...3 mm.



Note

- ◆ *The sealant bead must not be thicker than 3 mm otherwise excess sealant may get into the oil pan and clogg the strainer in the oil suction pipe.*
- ◆ *Take particular care when applying the sealant bead in the area of the sealing flange on the gearbox side -arrows-.*
- ◆ *The oil pan must be installed within 5 minutes after applying the silicone sealant -D 176 404 A2- .*



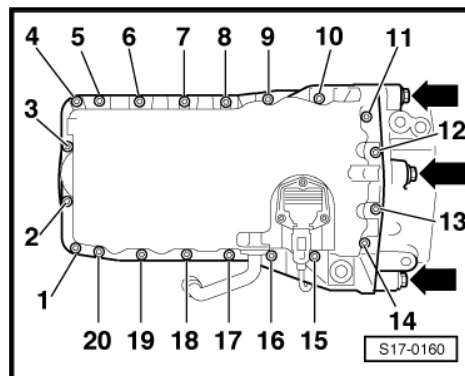


- Fit on oil pan and tighten the screws as follows:
- 1. Tighten screws -1...20- crosswise to 5 Nm.
- 2. Tighten the connecting screws of the oil pan/gearbox -arrows- to 40 Nm.



Note

When installing the oil pan on a removed engine, this work step is not carried out. Make sure however that the pan is flush with the cylinder block on the flywheel side.



- 3. Tighten screws -1...20- crosswise to 15 Nm.



Note

After installing the oil pan, allow the sealant to dry for about 30 minutes. Only then may engine oil be filled in.

- Fill with engine oil and check the oil level ⇒ Maintenance ; Booklet Octavia II .

1.7 Removing and installing oil pump

Removing

- Removing the oil pan ⇒ [page 103](#) .
- Release screws -4- and remove oil suction pipe -3-.
- Release screws -arrows- and remove baffle -2-.
- Unhook the oil pump -1- from the toothed belt and remove it.

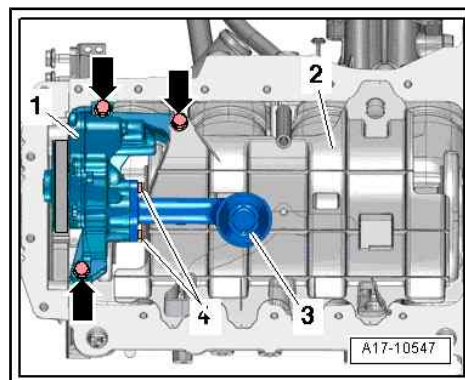
Install

Installation is performed in the reverse order, pay attention to the following points:



Note

Replace O-ring.



- Check the dowel sleeves at the oil pump housing -arrows- for centering the oil pump, insert the dowel sleeves if they are not present.
- Check smooth operation of oil pump, to do so turn the toothed belt sprocket with a finger.

i Note

A sluggish oil pump must be replaced.

- Check toothed belt for oil pump.

i Note

- ◆ Replace damaged toothed belt.
- ◆ After long duration the toothed belt can sag, this is not a fault.

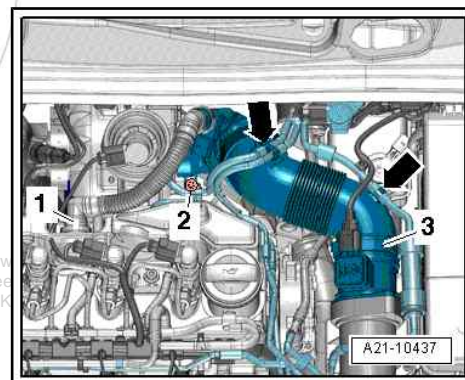
- Hook the oil pump with the toothed belt sprocket into the toothed belt and tighten together with the baffle.
- Installing the oil pan ➔ [page 103](#) .

1.8 Removing and installing oil pressure switch -F1-

Removing

- Remove engine cover ➔ [page 7](#) .
- Remove the hose for the crankcase ventilation -1-, to do so press together the release buttons.
- Release vacuum hoses -arrows-.
- Release hose clamp -3- and separate the intake hose from the air mass meter -G70- .
- Release screw -2-, swivel suction hose with connection fitting towards the rear and detach from exhaust gas turbocharger.

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- Unscrew screws -2- and -3- and remove engine lifting eye -1-.
- Unplug connector -arrow-.
- Screw out oil pressure switch -F1- .

Install

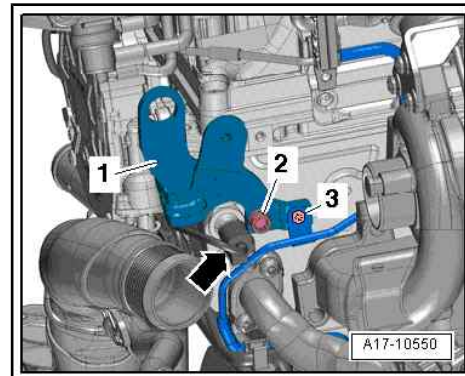
Installation is performed in the reverse order, pay attention to the following points:

i Note

Replace gasket ring.

Tightening torque: ➔ [page 69](#)

- Install vacuum line.





1.9 Testing oil pressure switch -F1- and oil pressure

Special tools and workshop equipment required

- ◆ Oil pressure tester , e.g. -V.A.G 1342-
- ◆ Voltage tester , e. g. -V.A.G 1527 B-
- ◆ Measuring tool set , e.g. -V.A.G 1594 C-

Test conditions

- Oil level o.k.
- Coolant temperature approx. 80°C.

1.9.1 Test after removal of the oil pressure switch -F1-



Note

The test is carried out after removing the oil pressure switch -F1- from the cylinder head ➔ [page 107](#) .

Test preparations

- Remove oil pressure switch -F1- ➔ [page 107](#) .

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- Screw the connection of the oil pressure tester -V.A.G 1342- with positioned gasket into the threaded hole for the oil pressure switch.
- Screw the oil pressure switch -2- into the oil pressure tester.

Test oil pressure switch -F1-

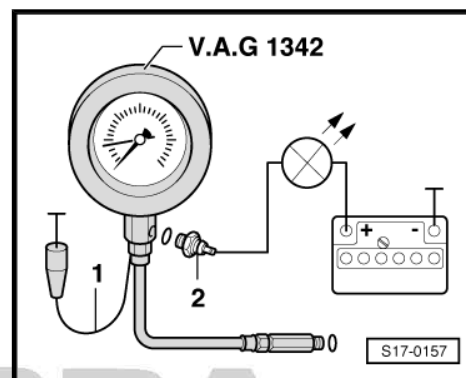
- Connect brown cable -1- of oil pressure tester to earth (-).
- Connect the voltage tester with the auxiliary cables from the measuring tool set to the oil pressure switch -F1- and to battery positive (+).
- The LED must not light up.

If the LED lights up:

- Replace oil pressure switch.

If the LED does not light up:

- Start the engine.



Note

Observe the testing equipment and the LED while actuating the starter since the switching point of the oil pressure switch -F1- can already be reached when starting up.

- At a pressure of 0.03...0.06 MPa (0.3...0.6 bar) the LED should light up.

If the LED does not light up:

- Replace oil pressure switch -F1- ➔ [page 107](#) .

Testing oil pressure

- Start the engine.
- Oil pressure when engine idling: at least 0.05 MPa (0.5 bar)
- Oil pressure at 2000 rpm: min. 0.2 MPa (2.0 bar)

If the specified values are not reached, the oil pump is defective.

- Replace oil pump ➔ [page 96](#) .
- Oil pressure at a higher engine speed: max. 0.4 MPa (4.0 bar)

If the specified value is exceeded, the pressure control valve in the oil pump is defective.

- Replace oil pump ➔ [page 96](#) .



Note

- ◆ *After testing the oil pressure switch -F1- or after checking the oil pressure, remove the oil pressure tester -V.A.G 1342- and install the oil pressure switch -F1- with a new gasket ring ➔ [page 107](#) .*
- ◆ *The tightening torque of the oil pressure switch -F1- is 22 Nm.*



1.9.2 Test without removal of the oil pressure switch -F1-



Note

The oil pressure switch -F1- remains installed and only the screw plug of the oil duct at the left of the cylinder head, which is more easily accessible, is unscrewed.

Test preparations

- Clean the surroundings and unscrew the screw plug of the oil duct at the left of the cylinder head.
- Screw the connection of the oil pressure tester -V.A.G 1342- with positioned gasket into the threaded hole for the screw plug.
- Close the hole for the oil pressure switch in the oil pressure tester by means of the removed screw plug of the oil duct with gasket.
- Disconnect the plug from the oil pressure switch -F1- at the rear of the cylinder head.

Test oil pressure switch -F1-

- Connect the voltage tester with the auxiliary cables from the measuring tool set to the oil pressure switch -F1- at the cylinder head and to battery positive (+).
- The LED must not light up.

If the LED lights up:

- Replace oil pressure switch -F1- ➔ [page 107](#) .

If the LED does not light up:

- Start the engine.

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Note

Observe the testing equipment and the LED while actuating the starter since the switching point of the oil pressure switch -F1- can already be reached when starting up.

- At a pressure of 0.03...0.06 MPa (0.3...0.6 bar) the LED should light up.

If the LED does not light up:

- Replace oil pressure switch -F1- ➔ [page 107](#) .

Testing oil pressure

- Start the engine.
- Oil pressure when engine idling: at least 0.05 MPa (0.5 bar)
- Oil pressure at 2000 rpm: min. 0.2 MPa (2.0 bar)

If the specified values are not reached, the oil pump is defective.

- Replace oil pump ➔ [page 96](#) .

- Oil pressure at a higher engine speed: max. 0.45 MPa (4.5 bar)

If the specified value is exceeded, the pressure control valve in the oil pump is defective.

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- Replace oil pump ➔ [page 96](#) .



Note

- ◆ *After testing the oil pressure switch -F1 - or after checking the oil pressure, remove the oil pressure tester -V.A.G 1342- and install the screw plug of the oil duct with a new gasket ring.*
- ◆ *Tightening torque of plug is 14 Nm.*

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19 – Cooling

1 Cooling system



WARNING

Hot steam or hot coolant may escape when the compensation bottle is opened. Cover the cap with a cloth and open carefully.



Note

- ◆ *When the engine is warm the cooling system is under pressure. If necessary reduce pressure before repairs.*
- ◆ *Secure all hose connections with spring strap clamps.*
- ◆ *Use pliers for spring strap clamps to fit the spring strap clips.*
- ◆ *Always replace seals and gasket rings.*
- ◆ *The arrows affixed to the coolant pipes and the coolant hoses must stand opposite to each other.*

1.1 Parts of cooling system engine side

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1 - Grommet

- ☐ not available separately

2 - Bushing

- ☐ not available separately

3 - 3 Nm

4 - 40 Nm

5 - Support

- ☐ for coolant recirculation pump 2 -V178-

6 - Coolant pipe - front

7 - O-ring

- ☐ replace

8 - 8 Nm

9 - Coolant pipe - right

10 - O-ring

- ☐ replace

11 - Retaining clip

- ☐ check tightness

12 - Coolant temperature sender at radiator outlet -G83-

- ☐ replace ⇒ [page 119](#)

13 - 9 Nm

14 - 9 Nm

15 - 9 Nm

16 - Coolant pipe - top

17 - Gasket

- ☐ replace

18 - Connection fittings

- ☐ for cylinder head

19 - O-ring

- ☐ replace

20 - Coolant temperature sender -G62-

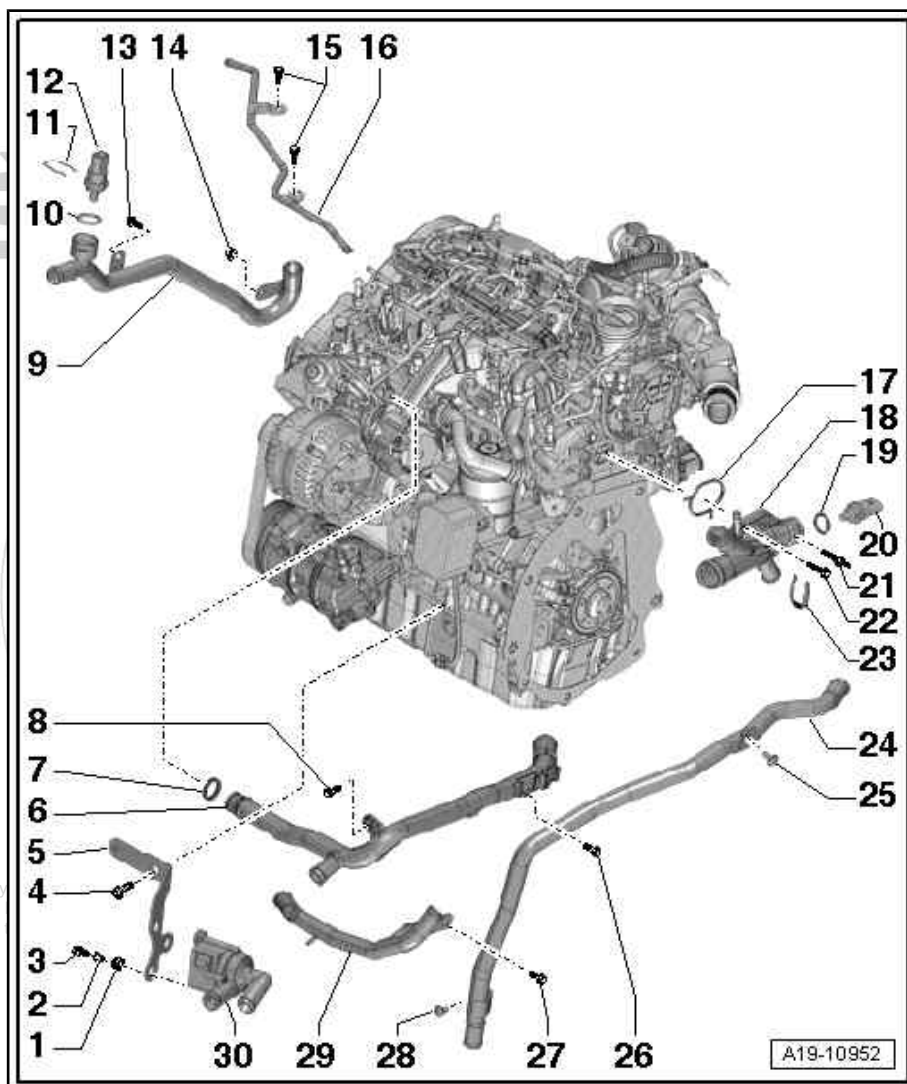
- ☐ replace ⇒ [page 119](#)

21 - Double screw, 9 Nm

22 - 9 Nm

23 - Retaining clip

- ☐ check tightness





24 - Coolant pipe - left

25 - 9 Nm

26 - 9 Nm

27 - 9 Nm

28 - 13 Nm

29 - Coolant pipe - front top

30 - Coolant recirculation pump 2 -V178-

- ☐ removing and installing ⇒ [page 117](#)

1.2 Connection diagram for coolant hoses

1 - Expansion reservoir

- ☐ with cap
- ☐ Test the pressure valve in the cap ⇒ [page 131](#)

2 - Radiator for exhaust gas recirculation

- ☐ after replacing fill entire system with fresh coolant ⇒ [page 115](#)
- ☐ removing and installing ⇒ [page 236](#)

3 - to auxiliary heating

4 - from the auxiliary heating

5 - Cylinder block

- ☐ after replacing fill entire system with fresh coolant ⇒ [page 115](#)

6 - Heat exchanger of heating system

- ☐ after replacing fill entire system with fresh coolant ⇒ [page 115](#)

7 - Throttle valve

- ☐ integrated into the coolant hose, not visible from the outside
- ☐ The fitting position is not defined, therefore the coolant hose must not be unclipped with the hose clamp (Risk of damage!)

8 - ATF radiator

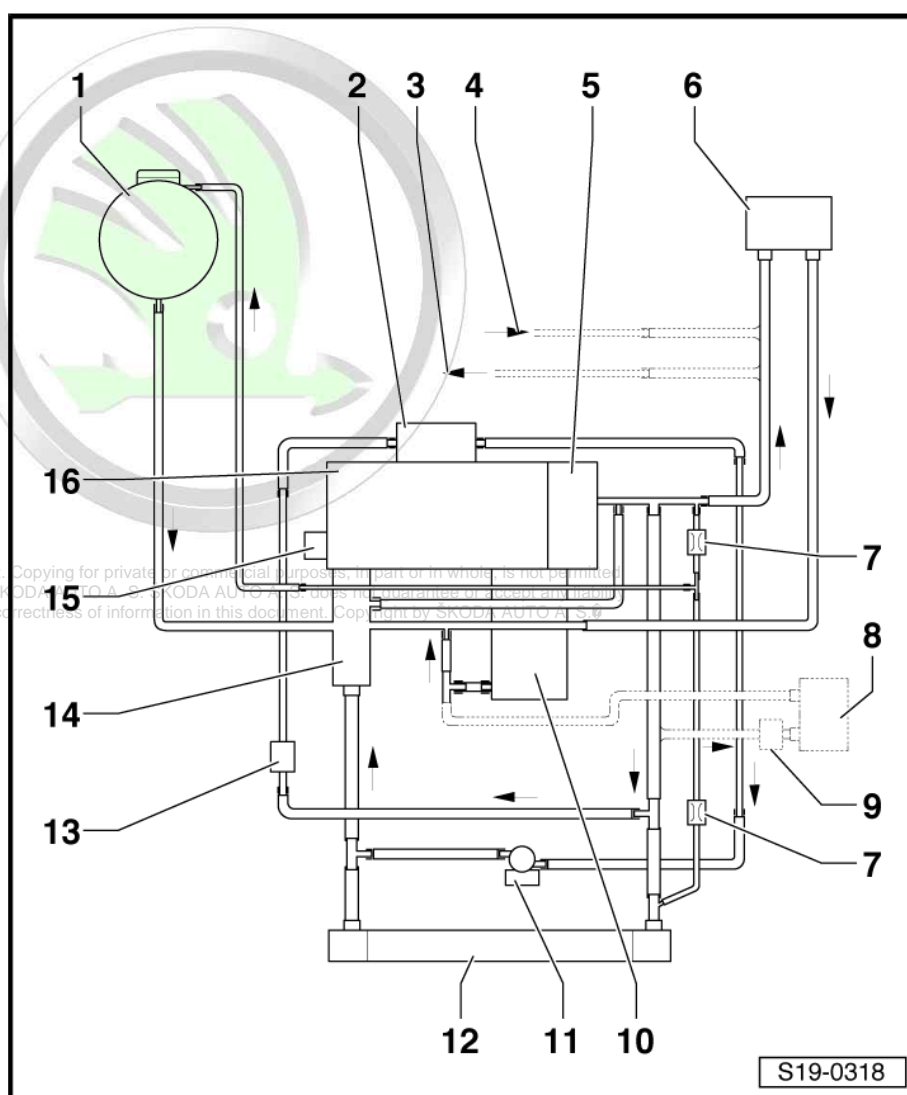
- ☐ only for automatic gearbox

9 - Coolant regulator

- ☐ only for automatic gearbox

10 - Engine oil cooler

- ☐ after replacing fill entire system with fresh coolant ⇒ [page 115](#)
- ☐ removing and installing ⇒ [page 98](#)



11 - Coolant recirculation pump 2 -V178-

- ❑ removing and installing ➔ [page 117](#)

12 - Radiator

- ❑ for coolant
- ❑ removing and installing ➔ [page 129](#)
- ❑ after replacing fill entire system with fresh coolant ➔ [page 115](#)

13 - Coolant temperature sender at radiator outlet -G83-

14 - 4/2 way valve with coolant regulator

- ❑ removing and installing ➔ [page 122](#)

15 - Coolant pump

- ❑ removing and installing ➔ [page 121](#)

16 - Cylinder head

- ❑ after replacing fill entire system with fresh coolant ➔ [page 115](#)

1.3 Draining and filling up coolant

Special tools and workshop equipment required

- ◆ Catch pan e.g. -VAS 6208-
- ◆ Pliers for spring strap clamps
- ◆ antifreeze tester

Draining



Note

Collect drained coolant in a clean container for proper disposal or reuse.

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WARNING

Hot steam or hot coolant may escape when the compensation bottle is opened. Cover the cap with a cloth and open carefully.

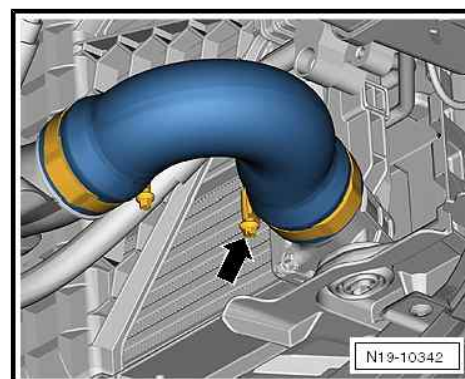
- Open the cap of the coolant expansion reservoir.
- Remove noise insulation ➔ Body Work ➔ Rep. gr. 50 .
- Remove right charge air hose.



WARNING

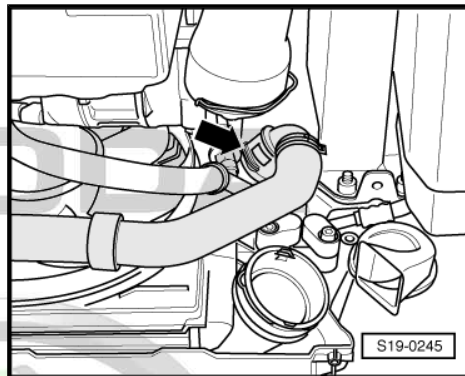
Shut off the opening of the charge air cooler, e.g. with a clean foam piece, so that no coolant can penetrate.

- Place a catch pan under the engine.

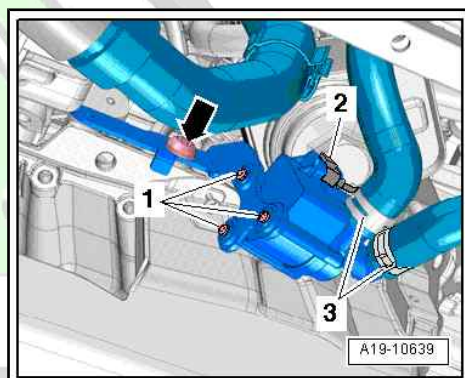




- Remove the right coolant hose from the radiator; to do so pull the retaining clip -arrow-.



- Detach the coolant hoses -3- from the coolant recirculation pump 2 -V178- .



- Remove the coolant hose from the oil filter holder -arrow- and drain residual coolant.

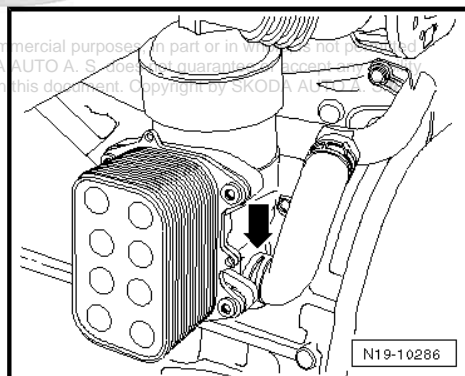
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Filling up

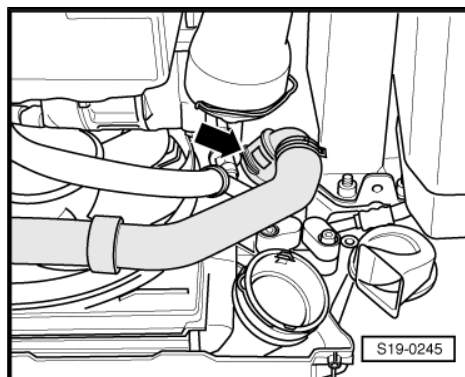


Note

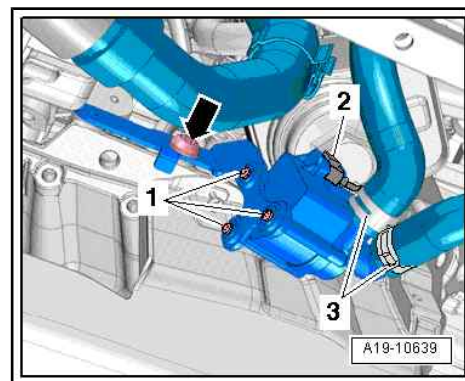
Replace O-rings.



- Connect right coolant hose at radiator -arrow-.



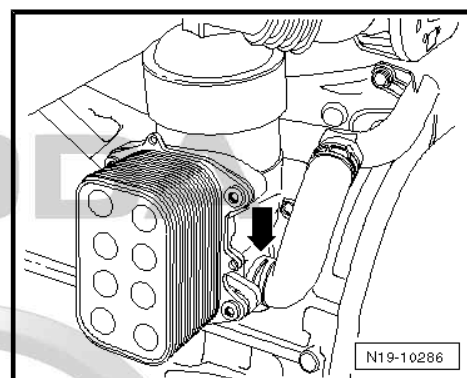
- Connect the coolant hoses -3- at the coolant recirculation pump 2 -V178- .



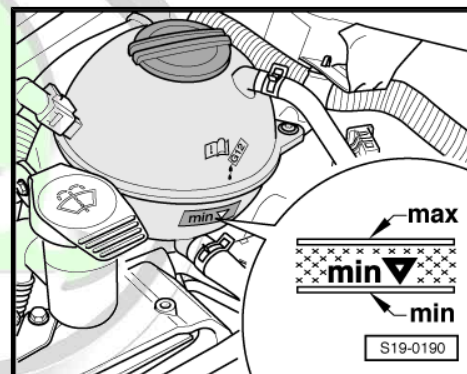
- Connect coolant hose at oil filter holder -arrow-.

Select the appropriate coolant additive from the Electronic Catalogue of Original Parts Škoda or from the list of allowed coolant additives ⇒ Maintenance ; Booklet Octavia II .

- Mix water with coolant in the correct ratio in a clean reservoir ⇒ Maintenance ; Booklet Octavia II .



- Top up coolant through the connection of the expansion reservoir, until the max. marking of the coolant level is reached.
- Switch off the heating, and if present, the air conditioning system.
- Start engine, run for not more than 2 minutes at approx. 1500 rpm and while doing so continuously top up coolant in the expansion reservoir.
- Seal expansion reservoir.
- Run engine until radiator fan starts.



WARNING

Hot steam or hot coolant may escape when the compensation bottle is opened. Cover the cap with a cloth and open carefully.

- Check the level of coolant when the expansion reservoir is closed and top up if necessary when the engine is cooled down.
- When engine is at operating temperature the coolant level must be at the maximum marking, when engine is cold between the minimum and the maximum markings.

1.4 Remove and install coolant recirculation pump 2 -V178-

Special tools and workshop equipment required

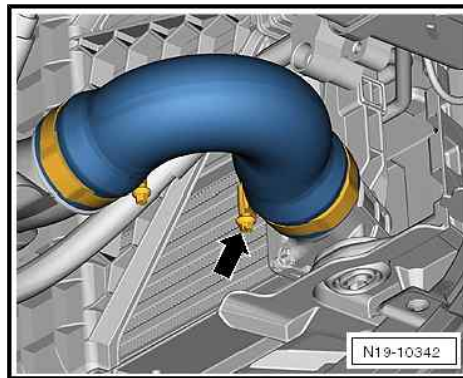
- ◆ Hose clamps up to a diameter of 25 mm -MP7-602 (3094)-
- ◆ Pliers for spring strap clamps

Removing

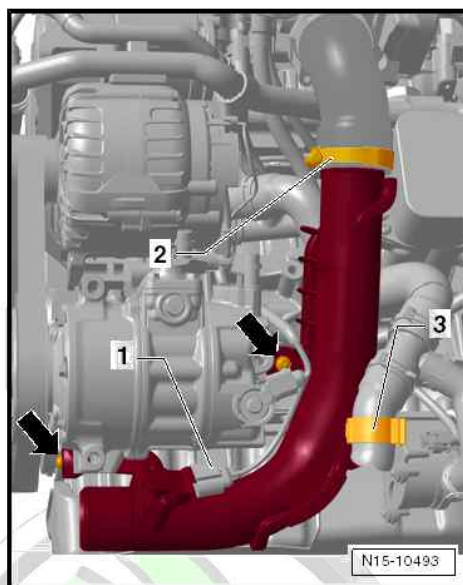
- Remove noise insulation ⇒ Body Work ⇒ Rep. gr. 50 .



- Remove right charge air hose.



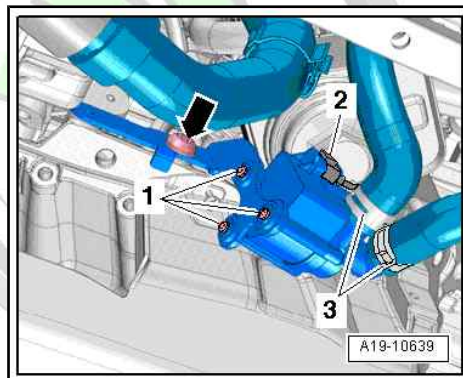
- Release screws -arrows-.
- Expose coolant hose -3-.
- Slacken the hose clamp -2- and push the charge air pipe to the right.



Note

In order to collect flowing out coolant, place a cloth below the coolant recirculation pump 2 -V178- .

- Pinch off the coolant hoses with hose clamps up to a diameter of 25 mm -MP7-602- , slacken spring strap clamps -3- and detach the hoses.
- Unplug connector -2-.
- Release screws -1- and remove coolant recirculation pump 2 -V178- .



Install

Installation is performed in the reverse order, pay attention to the following points:



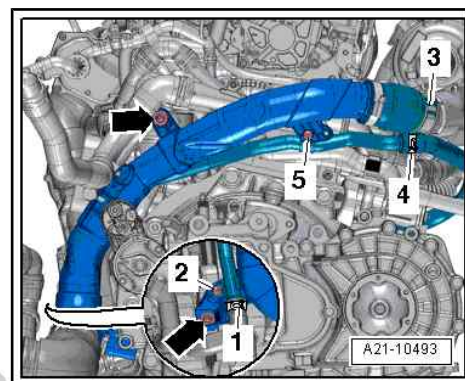
Note

- ♦ *Connections as well as charge air pipes and charge air hoses must be free of oil and grease before being installed.*
- ♦ *Observe the instructions for installing the charge air hoses and tightening torques of the screw clamps ➔ [page 177](#) .*
- Inspect coolant level, top up with coolant if necessary
➔ [page 115](#) .

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1.5 Replace coolant temperature sender - G62-

- Engine is cold
- Briefly open the cap for the coolant expansion reservoir in order to adjust the pressure in the coolant system.
- Remove air filter ➔ [page 214](#) .
- Remove noise insulation ➔ Body Work ➔ Rep. gr. 50 .
- Screw out screws -arrows- and screw -5-.
- Expose electrical cables and hoses on the left charge air pipe.
- Release hose clamp -3- and push charge air pipe to the side.

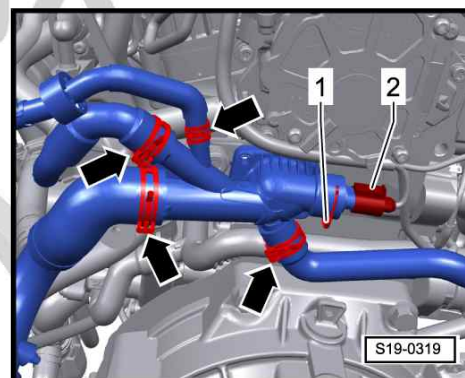


- Disconnect plug -2- at the coolant temperature sender -G62- .



Note

- ◆ *In order to collect flowing out coolant, place a cloth below the connection fitting.*
- ◆ *Have a new coolant temperature sender -G62- with a new gasket ring ready.*
- Remove the retaining clip -1-, pull the coolant temperature sender -G62- out of the connection fitting and install a new coolant temperature sender -G62- .



Further installation occurs in reverse order to removal.

- Inspect coolant level, top up with coolant if necessary ➔ [page 115](#) .

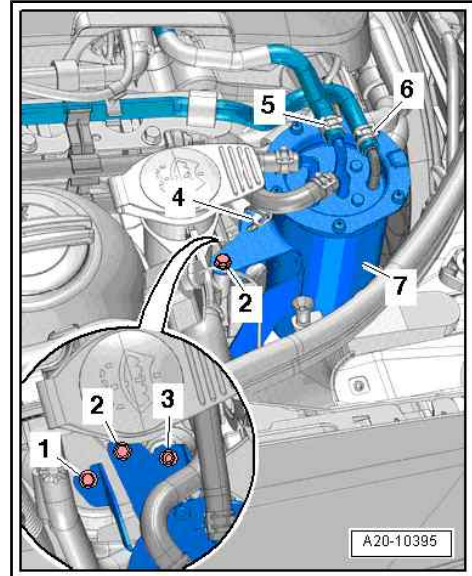
1.6 Replace coolant temperature sender at radiator outlet -G83-

- Engine is cold
- Briefly open the cap for the coolant expansion reservoir in order to adjust the pressure in the coolant system.
- Remove engine cover ➔ [page 7](#) .

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- Release screw -1-.
- Release screw -2- and nut -3-.
- Remove bracket -4- with fuel filter -7- and lay to the side with the connected fuel hoses.

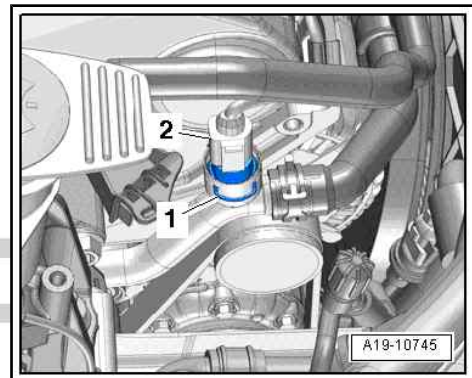


- Disconnect plug -2- at the coolant temperature sender at radiator outlet -G83-.



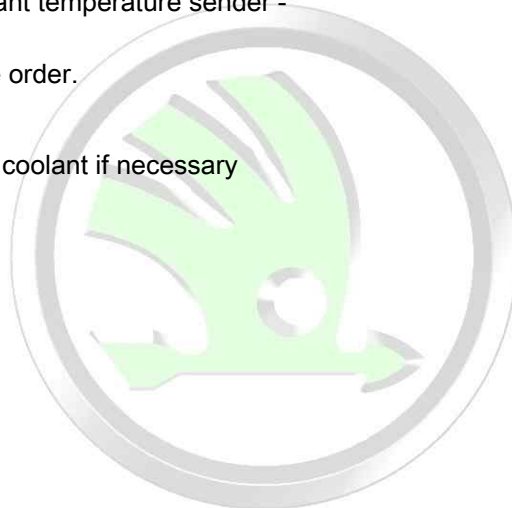
Note

- ♦ *In order to collect flowing out coolant, place a cloth below the right coolant pipe.*
- ♦ *Have a new coolant temperature sender at radiator outlet -G83- with a new gasket ring ready.*
- Pull off the retaining clip -1-, remove the coolant temperature sender at radiator outlet -G83- from the connection of the right coolant pipe and install new coolant temperature sender -G83-.



Further installation occurs in reverse order.

- Install fuel filter ➔ [page 140](#).
- Inspect coolant level, top up with coolant if necessary ➔ [page 115](#).



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2 Coolant pump and 4/2 way valve with coolant regulator

2.1 Coolant pump and 4/2 way valve with coolant regulator - Summary of components

1 - Coolant pump

- ❑ removing and installing
⇒ [page 121](#)

2 - 15 Nm

3 - O-ring

- ❑ replace

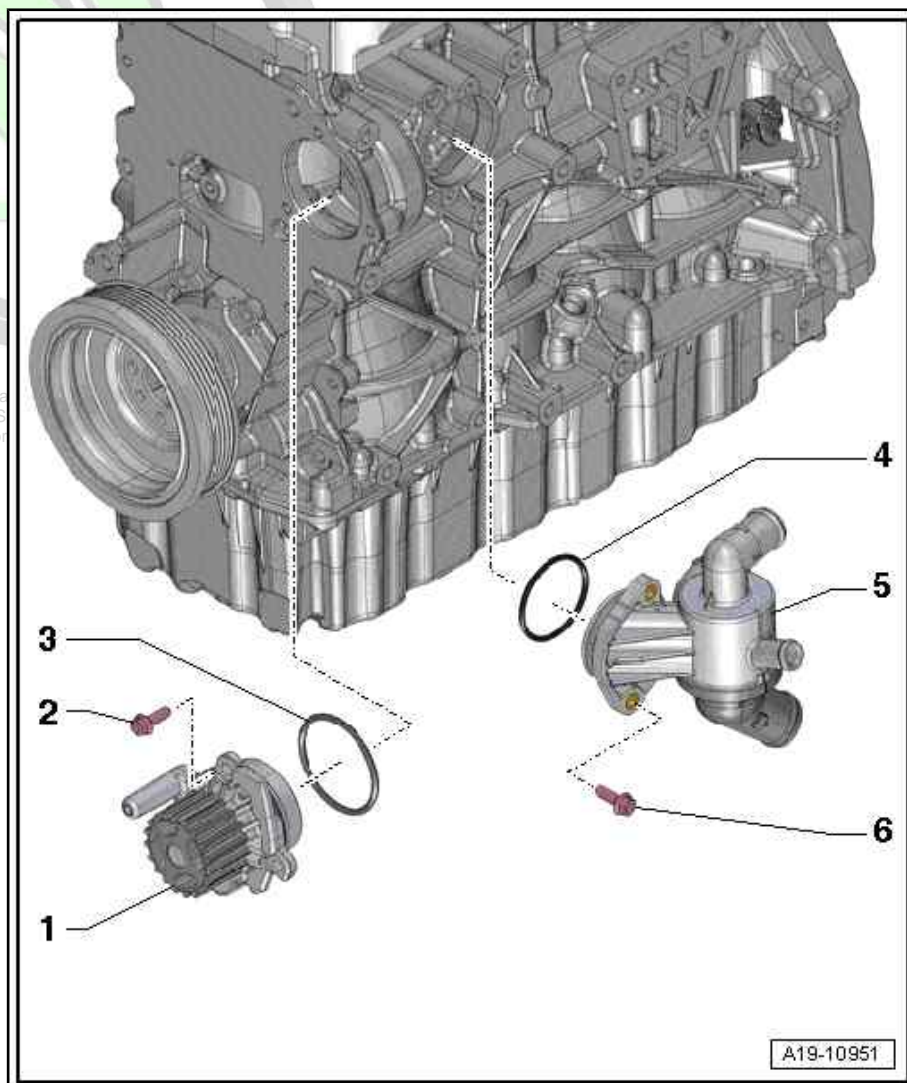
4 - O-ring

- ❑ replace

5 - 4/2 way valve with coolant regulator

- ❑ The coolant regulator is integrated in the 4/2 way valve and cannot be replaced separately
- ❑ removing and installing
⇒ [page 122](#)
- ❑ Testing coolant thermostat ⇒ [page 125](#)

6 - 15 Nm



2.2 Removing and installing coolant pump

Removing

- Drain coolant ⇒ [page 115](#) .
- Removing toothed belt ⇒ [page 33](#) .



- Release screws -1- and remove coolant pump -2-.
- Remove O-ring -3-.

Install

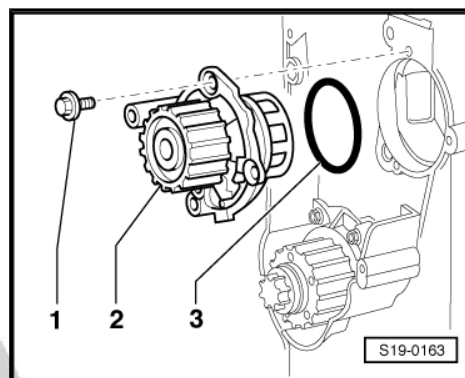
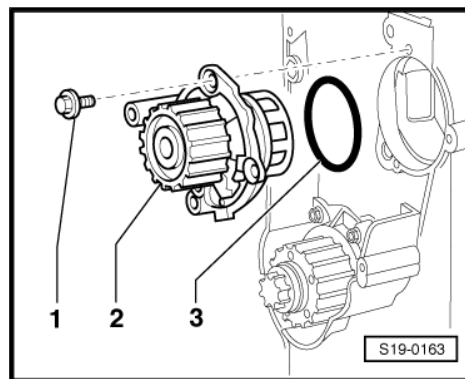
Installation is performed in the reverse order, pay attention to the following points:



Note

Replace O-ring.

- Clean sealing surface for O-ring, if necessary smoothen.
- Moisten the new O-ring -3- with coolant.
- Attach the coolant pump -2-.
- Fitting position: Plug in housing points down.
- Insert screws -1- of coolant pump and tighten to [⇒ page 121](#) .
- Installing the timing belt [⇒ page 38](#) .
- Top up coolant [⇒ page 115](#) .



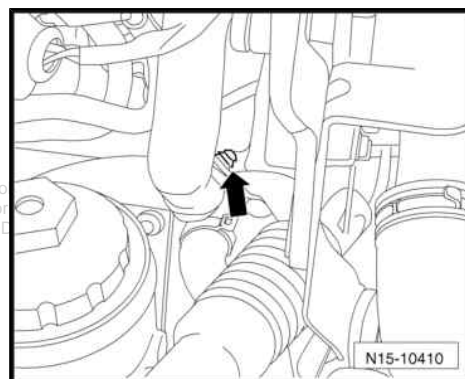
2.3 Removing and installing 4/2 way valve with coolant regulator

Special tools and workshop equipment required

- ♦ Removal tool for inner lining of the door panel -MP8-602/1-
- ♦ Pliers for spring strap clamps

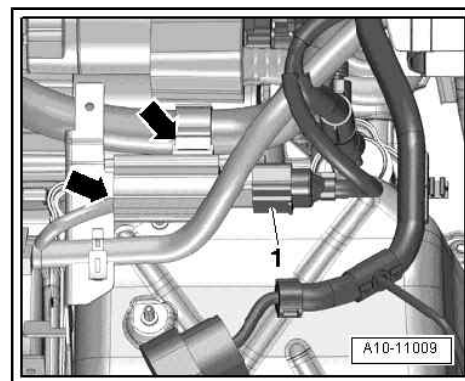
Removing

- Drain coolant [⇒ page 115](#) .
- Remove air filter with air mass meter -G70- and inlet hose [⇒ page 212](#) .
- Remove battery with battery tray [⇒ Electrical System](#) [⇒ Rep. gr. 27](#) .
- Unclip the wiring loom from the holder -arrow-.

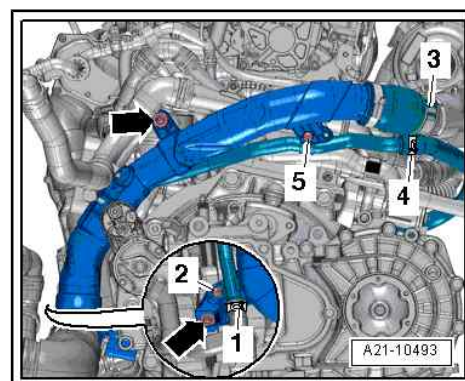


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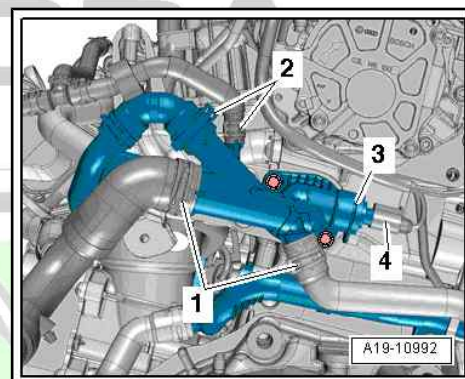
- Expose the wiring looms -arrows- and the plug connection -1- on the bracket.



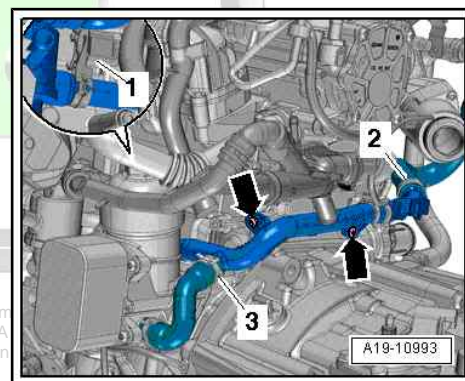
- Unscrew screws -2, 5- and -arrows-.
- Expose electrical cables and hoses on the left charge air pipe.
- Release hose clamp -3- and remove left charge air pipe.



- Remove the coolant hoses, to do so slacken the hose clamps -1-.



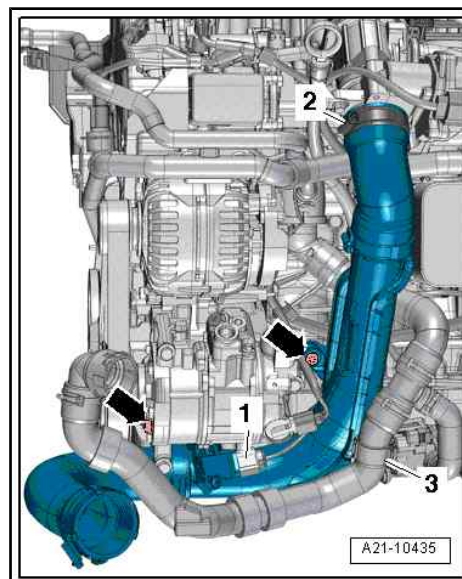
- Remove the plug connection -1- for the hall sender -G40- from the bracket and disconnect.
- Release the screws -arrows-, press off and detach the front coolant pipe from the 4/2 way valve to the left-hand side and leave it in the fitting position.



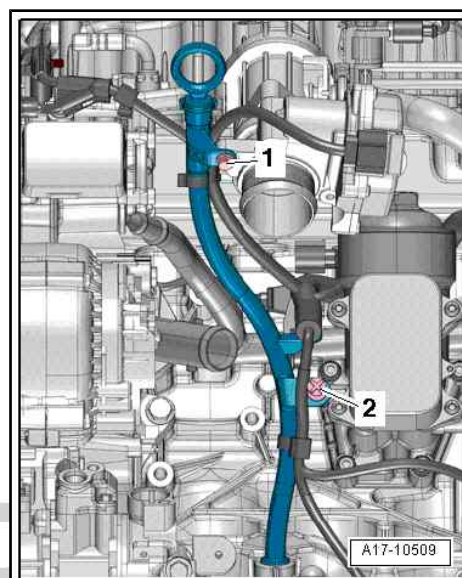
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- Release screws -arrows-.
- Expose coolant hose -3-.
- Loosen hose clamp -2-.
- Disconnect the plug -1- at the charge pressure sender -G31- / intake air temperature sender -G42- and remove the right charge air pipe.



- Slightly pull out the oil dipstick and release the screw -1-.
- Press off clip -2- with removal tool for inner lining of the door panel -MP8-602/1- .
- Pull out the oil dipstick guide pipe upwards out of the cylinder block and push it to the side.



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- Unscrew bolts -2-.
- Remove the coolant hoses, to do so slacken the hose clamps -1, 3, 4-.
- Remove 4/2 way valve with coolant regulator.

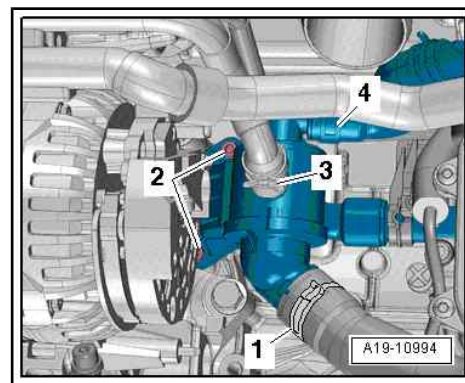
Install

Installation is performed in the reverse order, pay attention to the following points:



Note

- ◆ *Replace O-ring.*
- ◆ *Hose connections as well as charge air pipes and charge air hoses must be free of oil and grease before being installed.*
- ◆ *Observe the instructions for installing the charge air hoses and tightening torques of the screw clamps ➔ [page 177](#) .*
- ◆ *Secure all hose connections with prescribed hose clamps ➔ *Electronic Catalogue of Original Parts* .*
- Install the oil dipstick guide pipe ➔ [page 96](#) .
- Top up coolant ➔ [page 115](#) .



2.4 Testing coolant thermostat

- Heat up the removed 4/2 way valve with coolant regulator in a water bath.

Start of opening	Full opening	Stroke
approx. 87°C	approx. 102 °C ¹⁾	min. 8 mm
¹⁾ Cannot be tested.		

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3 Radiator and fan

3.1 Radiator with a radiator fan - Summary of components

1 - Radiator

- ☐ removing and installing
⇒ [page 129](#)
- ☐ after replacing fill entire
system with fresh cool-
ant ⇒ [page 115](#)

2 - Screw cap

- ☐ Test pressure
0.14...0.16 MPa
(1.4...1.6 bar)
- ☐ check ⇒ [page 131](#)

3 - Connector

4 - 3 Nm

5 - Expansion reservoir

6 - O-ring

- ☐ replace if damaged

7 - Bottom coolant hose

- ☐ to connection fitting of
4/2 way valve with cool-
ant regulator at cylinder
block
- ☐ connection diagram for
coolant hoses
⇒ [page 114](#)

8 - Radiator fan -V7-

- ☐ with radiator fan control
unit -J293-
- ☐ removing and installing
⇒ [page 128](#)

9 - Fan shroud

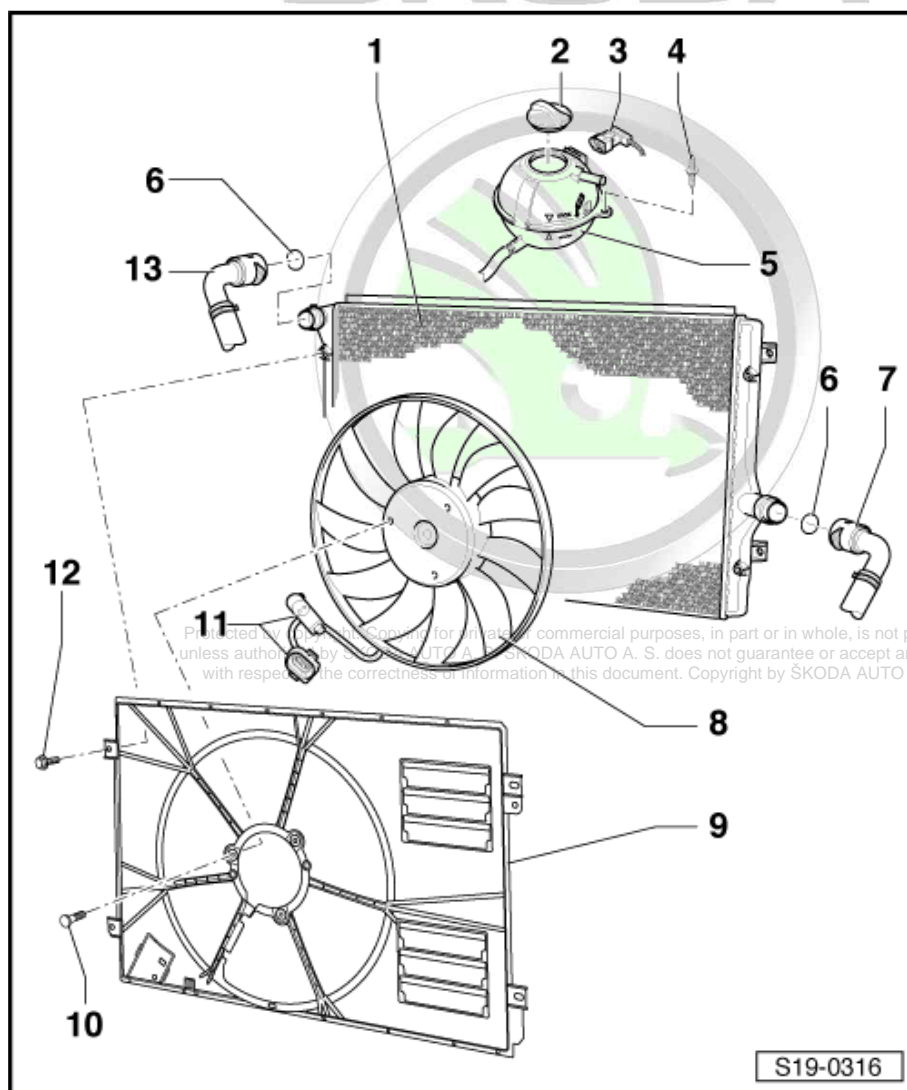
10 - 5 Nm

11 - Connector

12 - 5 Nm

13 - Top coolant hose

- ☐ To connection fitting at cylinder head
- ☐ connection diagram for coolant hoses ⇒ [page 114](#)



3.2 Radiator with two radiator fans - Summary of components

1 - Top coolant hose

- ☐ To connection fitting at cylinder head
- ☐ connection diagram for coolant hoses
⇒ [page 114](#)

2 - O-ring

- ☐ replace if damaged

3 - Radiator

- ☐ removing and installing
⇒ [page 129](#)
- ☐ after replacing fill entire system with fresh coolant
⇒ [page 115](#)

4 - Screw cap

- ☐ Test pressure
0.14...0.16 MPa
(1.4...1.6 bar)
- ☐ check ⇒ [page 131](#)

5 - Connector

6 - 3 Nm

7 - Expansion reservoir

8 - 5 Nm

9 - 5 Nm

10 - Bottom coolant hose

- ☐ to connection fitting of 4/2 way valve with coolant regulator at cylinder block
- ☐ connection diagram for coolant hoses
⇒ [page 114](#)

11 - Right radiator fan -V35-

- ☐ removing and installing ⇒ [page 128](#)

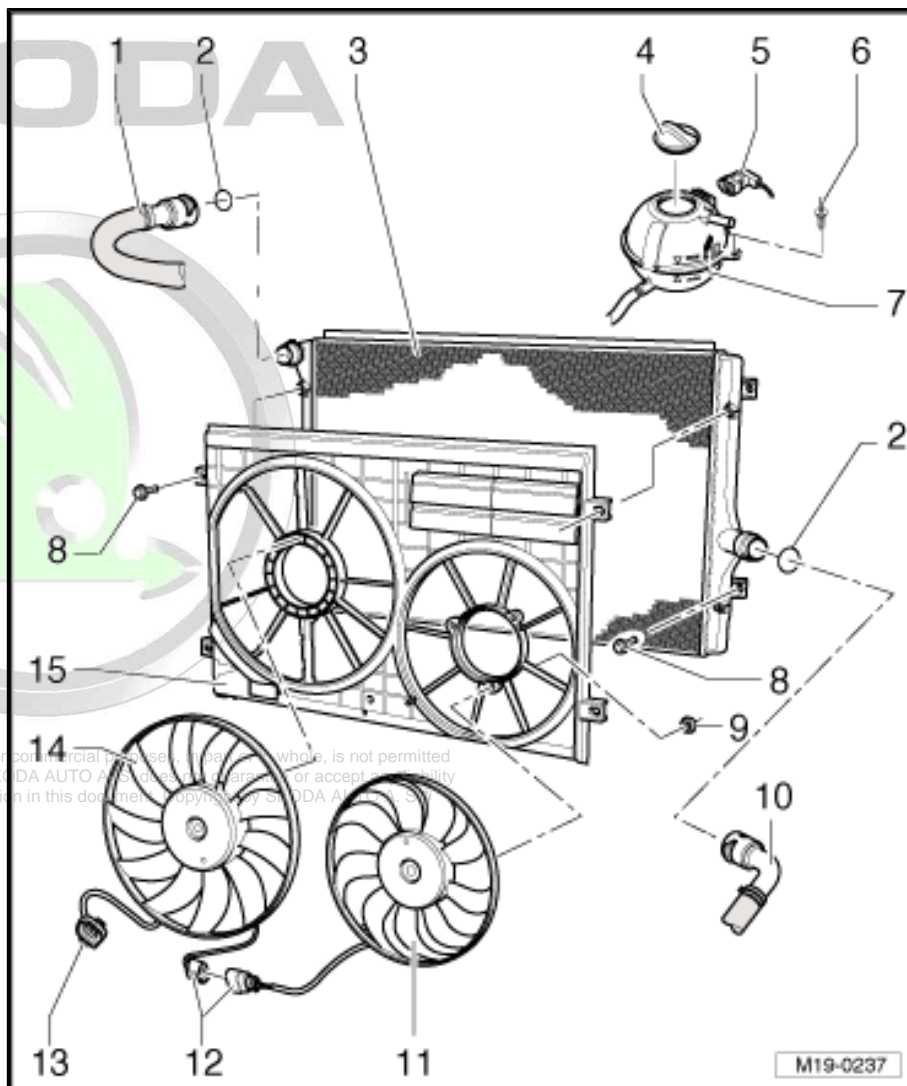
12 - Connector

13 - Connector

14 - Radiator fan -V7-

- ☐ with radiator fan control unit -J293-
- ☐ removing and installing ⇒ [page 128](#)

15 - Fan shroud

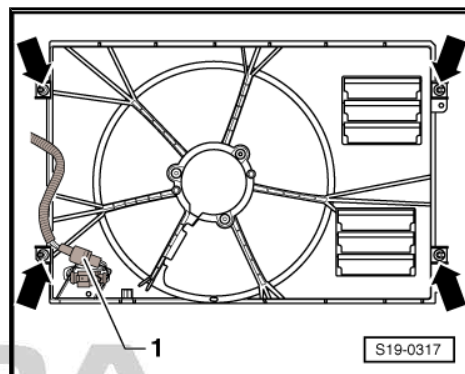


3.3 Removing and installing fan shroud and radiator fan

Removing

For vehicles with a fan

- Unscrew top screws -top arrows- of the fan shroud.

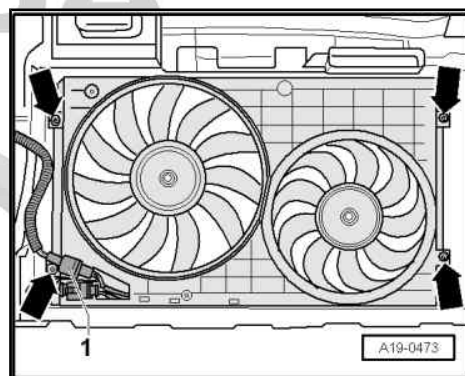


For vehicles with two fans

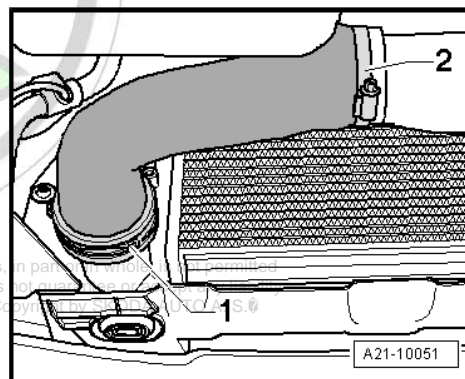
- Unscrew top screws -top arrows- of the fan shroud.

Continued for all vehicles

- Remove noise insulation ⇒ Body Work ⇒ Rep. gr. 50 .

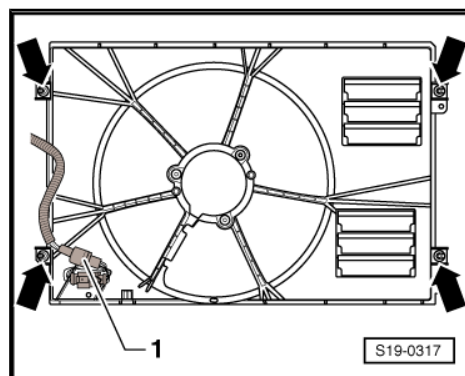


- Remove the left charge air hose, to do so slacken the hose clamps -1 and 2-.



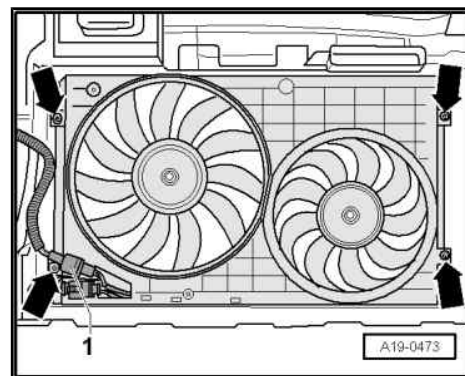
For vehicles with a fan

- Disconnect plug connection -1-.
- Unscrew bottom screw -bottom arrows- of the fan shroud.
- Remove fan shroud with radiator fan downwards.
- Release the screws of the fan ⇒ [Item 10 \(page 126\)](#) and remove the radiator fan from the shroud.



For vehicles with two fans

- Disconnect plug connection -1-.
- Unscrew bottom screw -bottom arrows- of the fan shroud.
- Remove fan shroud with radiator fans downwards.

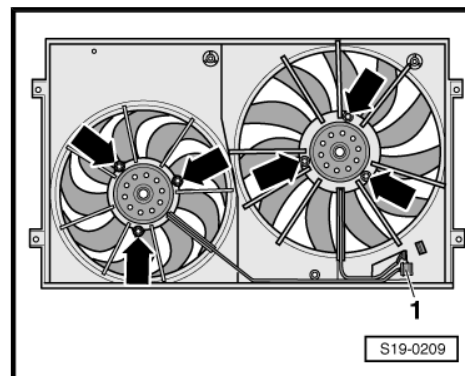


- Separate plug connection -1- and expose cables.
- Unscrew the nuts -arrows- and remove the radiator fan from the fan shroud.

Install

Installation is performed in the reverse order, pay attention to the following points:

- ♦ Tightening torques ➔ [page 126](#) and ➔ [page 127](#) .



3.4 Removing and installing radiator

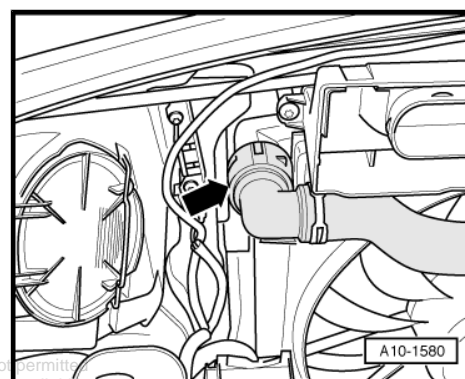
Special tools and workshop equipment required

- ♦ Catch pan e.g. -VAS 6208-
- ♦ Pliers for spring strap clamps

Removing

- Drain coolant ➔ [page 115](#) .
- Pull off left coolant hose from radiator -arrow-.
- Remove fan shroud with radiator fans ➔ [page 128](#) .

On vehicles with air conditioning



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- Disconnect plug -A- on the high pressure sender -G65- -B-.

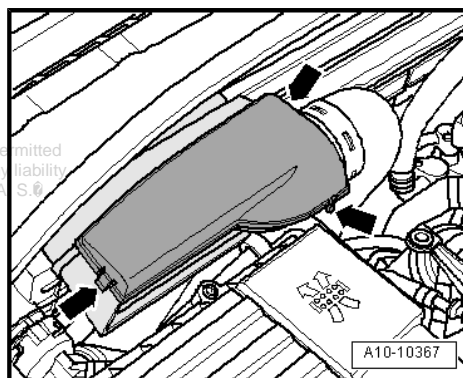
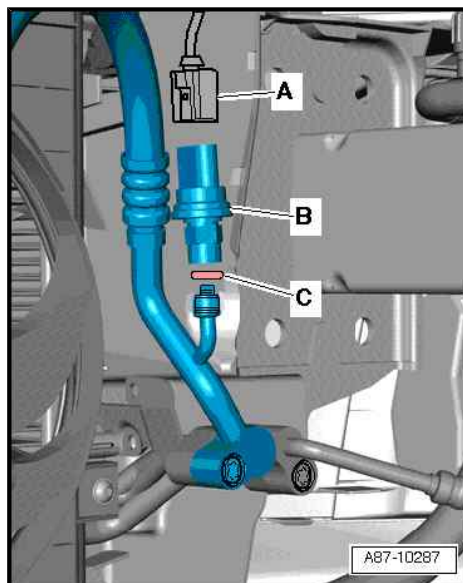
Continued for all vehicles

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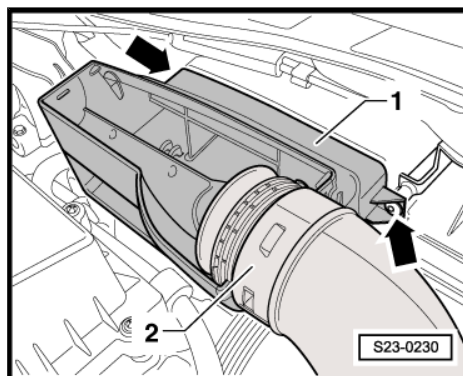


- Remove cover for connection fitting, to do so release lateral retaining clasps -arrows-.

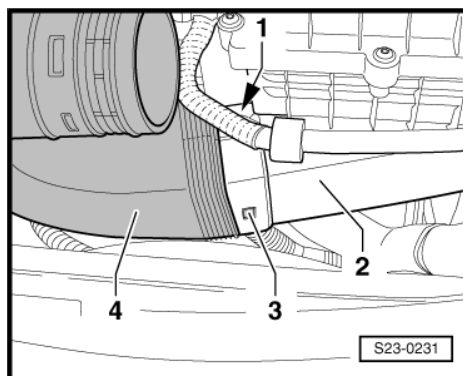
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- Release screws -arrows- for the inlet connection -1- and remove connecting hose -2-.



- Press in catches -1- and -3- and pull off connecting hose -4- from air filter -2-.



- Screw out screws -arrows- and remove the radiator upwards.

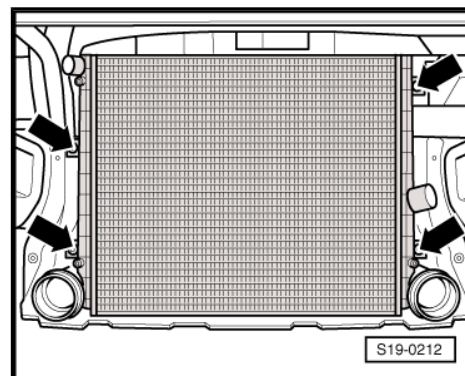
Install

Installation is performed in the reverse order, pay attention to the following points:



Note

- ◆ Replace gasket rings and O-rings.
- ◆ Secure all hose connections with spring strap clamps.
- Top up coolant ➔ [page 115](#) .



3.5 Checking the coolant system for leak-tightness

3.5.1 Checking with the cooling system testing device -V.A.G 1274-

Special tools and workshop equipment required

- ◆ Cooling system testing device , e.g. -V.A.G 1274-
- ◆ Adapter , e.g. -V.A.G 1274/8-
- ◆ Adapter , e.g. -V.A.G 1274/9-

Test condition

- Engine is at operating temperature.

Test sequence



WARNING

Hot steam or hot coolant may escape when the compensation bottle is opened.

- ◆ Wear safety goggles and safety clothing, in order to avoid eye injuries and scalding.
- ◆ Cover the cap with a cloth and open carefully.

- Open the cap of the coolant expansion reservoir.

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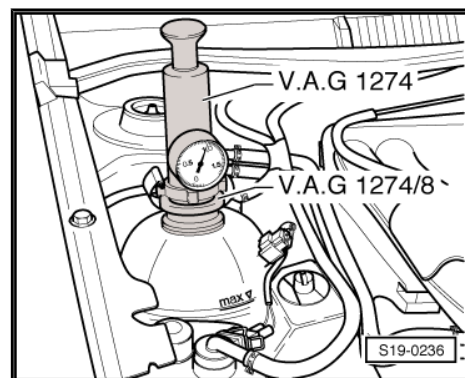
- Position tester -V.A.G 1274- with adapter -V.A.G 1274/8- on the compensation bottle.

- Generate a pressure of approx. 0.1 MPa (1.0 bar) for testing the cooling system.

If the pressure drops:

- Search position of the leak and repair fault.

Test the pressure valve in the cap

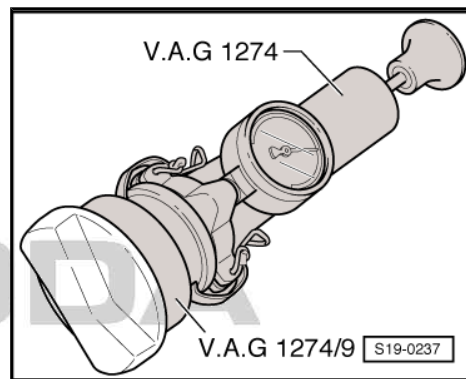




- Position the cooling system testing device -V.A.G 1274- with adapter -V.A.G 1274/9- on the cap.
- Generate a pressure for testing the pressure valve in the screw cap.
- The pressure valve should open at a pressure of 0.14...0.16 MPa (1.4...1.6 bar).

If the valve does not open in the prescribed pressure range:

- Replace cap.



3.5.2 Checking with the cooling system testing device -V.A.G 1274 B-

Special tools and workshop equipment required

- ◆ Cooling system testing device , e.g. -V.A.G 1274 B-
- ◆ Adapter , e.g. -V.A.G 1274/8-
- ◆ Adapter , e.g. -V.A.G 1274/9-

Test condition

- Engine is at operating temperature.

Test sequence



WARNING

Hot steam or hot coolant may escape when the compensation bottle is opened.

- ◆ ***Wear safety goggles and safety clothing, in order to avoid eye injuries and scalding.***
- ◆ ***Cover the cap with a cloth and open carefully.***

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- Open the cap of the coolant expansion reservoir.
- Screw the adapter -V.A.G 1274/8- into the coolant expansion reservoir.
- Connect the connecting piece -V.A.G 1274 B/1- to the adapter -V.A.G 1274/8- .

- Connect the connecting piece -V.A.G 1274 B/1- via the delivered connecting hose to the cooling system testing device - V.A.G 1274 B- .
- Using the hand pump of the testing device generate a pressure of approx. 0.1 MPa (1.0 bar).



WARNING

Risk of scalding!

- ◆ ***Before the cooling system testing device -V.A.G 1274 B- is separated from the connecting hose or the connecting piece -V.A.G 1274 B/1- , the existing pressure must absolutely be released.***
- ◆ ***For this step, press the pressure relief valve on the cooling system testing device -V.A.G 1274 B- until the pressure gauge indicates the value »0«.***

If the pressure drops:

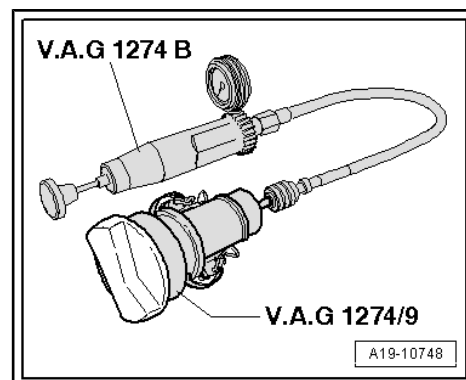
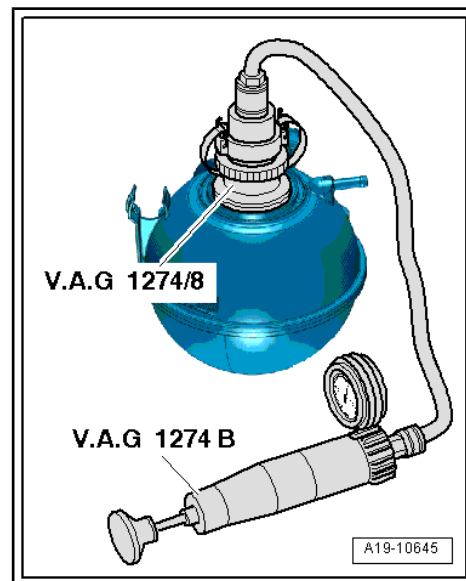
- Search position of the leak and repair fault.

Test the pressure valve in the cap For commercial purposes, in part or in whole, is not permitted unless authorised by SKODA AUTO A. S. SKODA AUTO A. S. does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright © 2011 SKODA AUTO A. S. ®

- Screw the screw cap into the adapter -V.A.G 1274/9- .
- Connect the connecting piece -V.A.G 1274 B/1- to the adapter -V.A.G 1274/9- .
- Connect the connecting piece -V.A.G 1274 B/1- via the delivered connecting hose to the cooling system testing device - V.A.G 1274 B- .
- Generate a pressure for testing the pressure valve in the screw cap.
- The pressure valve should open at a pressure of 0.14...0.16 MPa (1.4...1.6 bar).

If the valve does not open in the prescribed pressure range:

- Replace cap.





20 – Fuel supply system

1 Removing and installing parts of the fuel supply system



Note

- ◆ *Fuel lines are secured with quick-release couplings.*
- ◆ *Fuel hoses at the engine must only be secured with spring-type clips ⇒ electronic catalogue of original parts .*
- ◆ *Use pliers for spring strap clips to fit the spring strap clips.*

Observe safety measures ⇒ [page 3](#) .

Observe rules for cleanliness ⇒ [page 4](#) .

1.1 Behaviour in case of misfuelling



Caution

Fueling with incorrect fuel can result in irreversible damage to the high pressure components, in particular to the high pressure pump, because of inadequate fuel lubricity and the dirt contained in the fuel.

- ◆ *The damage is caused by seizures and the formation of abrasion.*
- ◆ *This abrasion damages the fuel pressure regulating valve and the injection units.*

Here are 2 examples which show the consequences of misfueling.

Example 1

Misfueling was noticed BEFORE starting the engine, the engine was NOT started.

Example 2

Misfueling was noticed AFTER starting the engine. Contaminated or incorrect fuel was already drawn in and is present in the high pressure parts.



Note

Collect the incorrect fuel which was drained from the fuel tank and the diesel fuel which was used for cleaning the fuel tank and dispose.

Behaviour in case of example 1



Caution

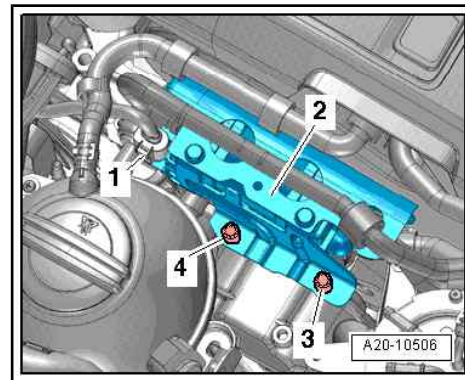
Do not switch on the ignition.
The engine must not be started.

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- Disconnect the plug -1- at the additional fuel pump -V393- in the engine compartment.
- Completely empty the fuel tank ➔ [page 142](#) .
- Fill the fuel tank with 5 ltr. of diesel fuel and empty it again.
- Completely fill up the fuel tank with diesel fuel.
- Fit the plug on the additional fuel pump -V393- in the engine compartment.
- Perform a test drive.

Behaviour in case of example 2

- Completely empty the fuel tank ➔ [page 142](#) .
- Remove fuel delivery unit ➔ [page 143](#) .
- Check the fuel tank for dirt and fine metal swarf, if necessary clean with great care.
- Install fuel delivery unit ➔ [page 143](#) .
- Fill the fuel tank with 5 ltr. of diesel fuel and empty it again.
- Replace the fuel filter ➔ [page 140](#) .
- Replace all of the following parts:
 - ◆ High pressure pump ➔ [page 187](#) .
 - ◆ High pressure lines ➔ [page 199](#) .
 - ◆ Fuel high pressure reservoir ➔ [page 200](#) .
 - ◆ Fuel pressure regulating valve -N276 - ➔ [page 205](#) .
 - ◆ Fuel pressure sender -G247- ➔ [page 202](#) .
 - ◆ Injection units ➔ [page 196](#) .
 - ◆ Fuel return-flow lines ➔ [page 184](#) .
 - ◆ Additional fuel pump -V393- in engine compartment ➔ [page 160](#) .
- Completely fill up the fuel tank with diesel fuel.
- Fill up the fuel system ➔ [page 189](#) .
- Perform a test drive.



1.2 Summary of components of fuel tank with attached parts - Vehicles with front-wheel drive



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1 - Mounting part

2 - Screw cap

- ☐ replace the O-ring if it is damaged

3 - Earth connection

- ☐ check for firm seating

4 - 11 Nm

5 - Guide

6 - 25 Nm

- ☐ replace

7 - Fuel tank

- ☐ when removing, support using the engine/gear-box jack , e.g. -V.A.G 1383 A-
- ☐ removing and installing ➔ [page 151](#)

8 - Circlip

9 - Support

- ☐ for exhaust pipe

10 - Tensioning strap

- ☐ Check fitting position

11 - Heat shield

12 - Sealing ring

- ☐ replace if damaged
- ☐ insert dry into the opening of the fuel tank
- ☐ must be moistened on the inside with fuel before assembly of the fuel delivery unit

13 - Fuel delivery unit

- ☐ with sender for fuel gauge display
- ☐ removing and installing ➔ [page 143](#)
- ☐ note the correct installed position of the fuel tank ➔ [page 137](#)
- ☐ inspecting fuel pump ➔ [page 156](#)
- ☐ Clean strainer if dirty
- ☐ removing and installing the sender for fuel gauge ➔ [page 148](#)

14 - Lock ring, 110 Nm

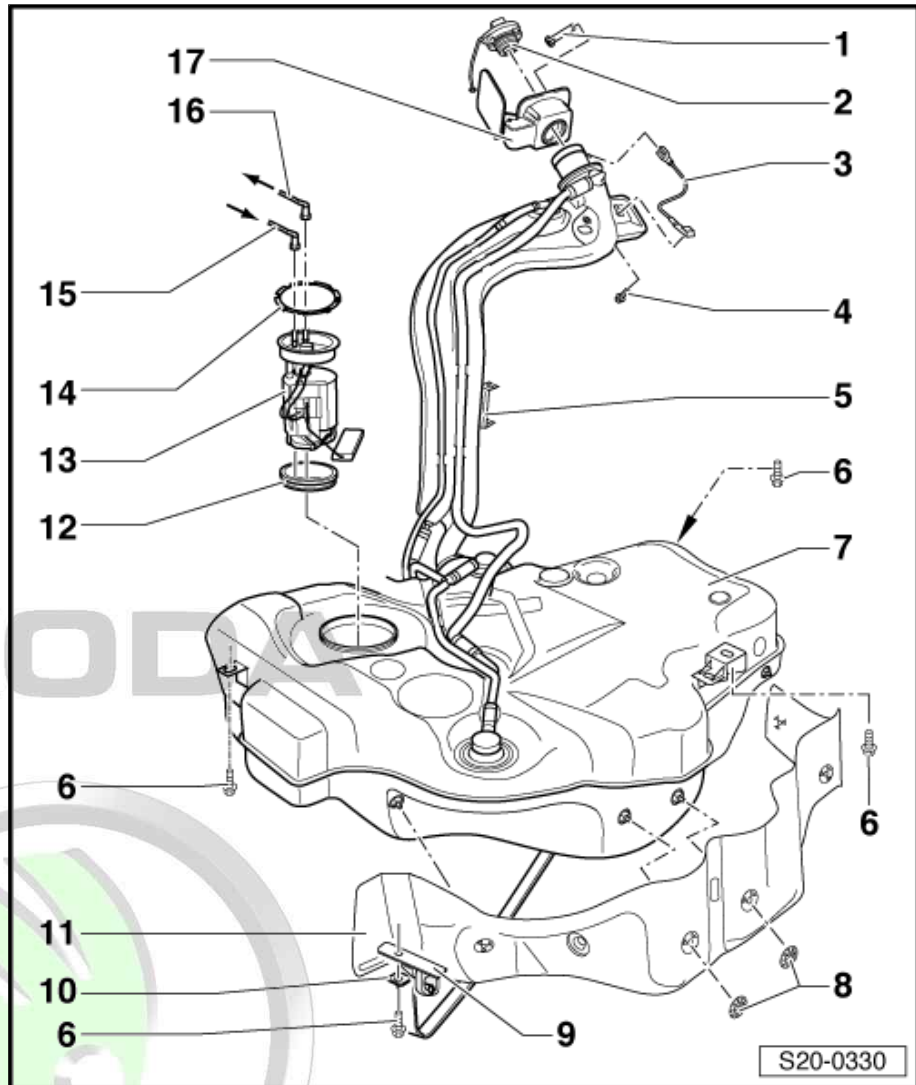
- ☐ slacken and tighten with wrench -T30101 (3087)-
- ☐ pay attention to correct position

15 - Return-flow line

- ☐ from fuel filter
- ☐ clipped in place on fuel tank
- ☐ pay attention to correct position
- ☐ blue

16 - Feed line

- ☐ to fuel filter
- ☐ clipped in place on fuel tank



- ☐ pay attention to correct position
- ☐ black

17 - Fuel tank lid unit

- ☐ with rubber bowl
- ☐ removing and installing ⇒ Body Work ⇒ Rep. gr. 55

Fitting location of the fuel delivery unit

The marking -3- on the flange of the fuel delivery unit points against the direction of travel.

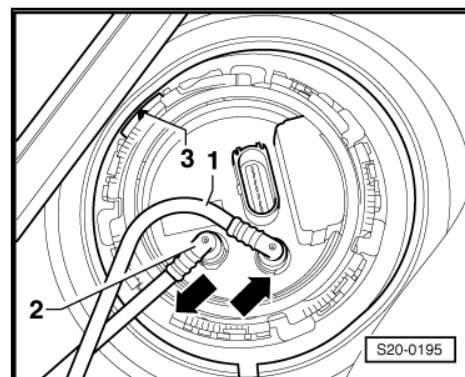


Note

The fuel delivery unit can only be installed in this position.

Return line -1- blue.

Feed line -2- black.



Note

After installing the fuel delivery unit, check whether the feed line and return-flow line are correctly clipped in place on the fuel tank.

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1.3 Summary of components of fuel tank with attached parts - Vehicles with four-wheel drive

1 - Fuel tank lid unit

- ☐ with rubber bowl
- ☐ removing and installing
⇒ Body Work ⇒ Rep.
gr. 55

2 - Screw cap

- ☐ replace the O-ring if it is damaged

3 - Mounting part

4 - Earth connection

- ☐ check for firm seating

5 - 10 Nm

6 - Suction spray pump

- ☐ connected to fuel gauge sender 2 -G169-
- ☐ removing and installing

7 - Lock ring, 110 Nm

- ☐ use wrench -T30101 (3087)- for removing and installing
- ☐ check for firm seating

8 - Fuel gauge sender 2 - G169-

- ☐ note the installed position of the fuel tank
⇒ [page 139](#)
- ☐ removing and installing
⇒ [page 149](#)

9 - Sealing ring

- ☐ insert dry into the opening of the fuel tank
- ☐ replace if damaged
- ☐ only moisten from the inside the seal of the flange with fuel for installation purposes

10 - Fuel tank

- ☐ when removing, support with the engine/gearbox jack e.g. -V.A.G 1383 A -
- ☐ removing and installing ⇒ [page 153](#)

11 - Tensioning strap

- ☐ Check fitting position

12 - 25 Nm

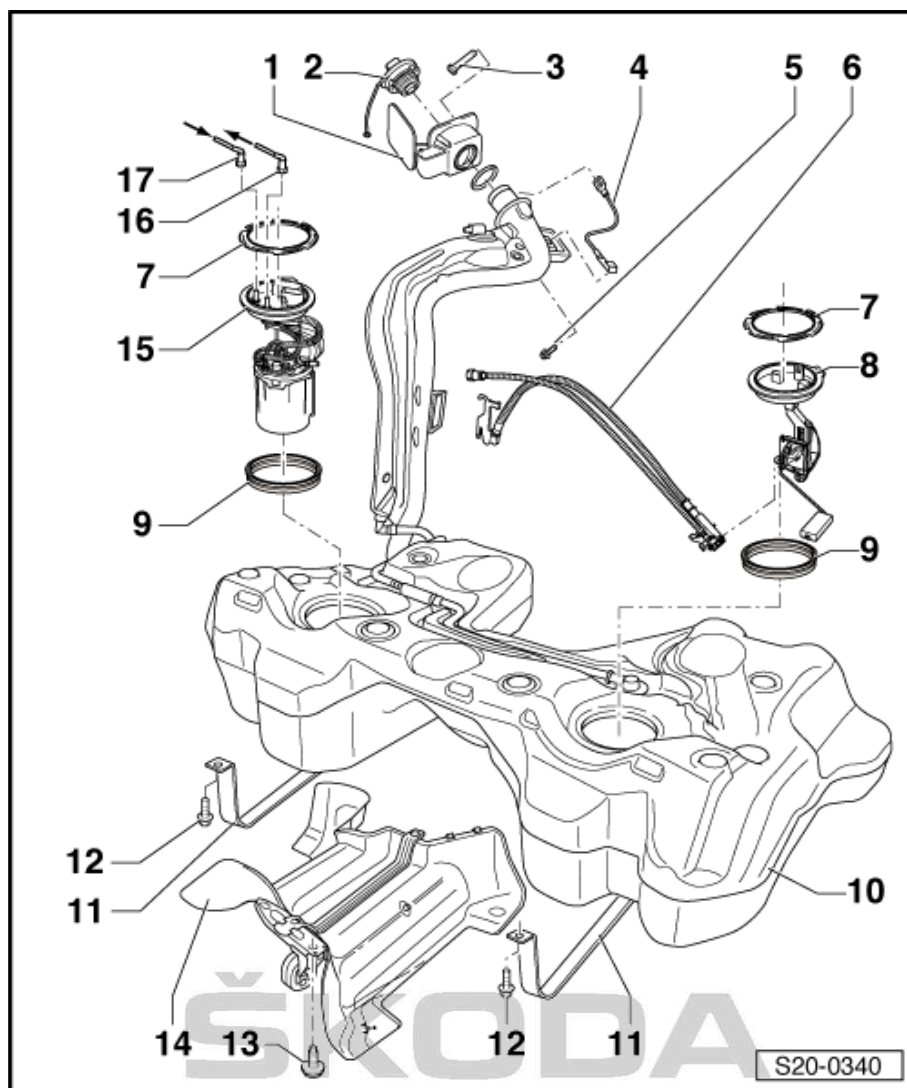
- ☐ replace

13 - 25 Nm

14 - Heat shield

15 - Fuel delivery unit

- ☐ with sender for fuel gauge display -G-
- ☐ removing and installing ⇒ [page 145](#)
- ☐ note the installed position of the fuel tank ⇒ [page 139](#)



- ☐ inspecting fuel pump ➔ [page 156](#)
- ☐ Clean strainer if dirty
- ☐ Removing and installing the sender for fuel gauge display -G- ➔ [page 148](#)

16 - Feed line

- ☐ to fuel filter
- ☐ clipped in place on fuel tank
- ☐ check for firm seating
- ☐ black

17 - Return-flow line

- ☐ from fuel filter
- ☐ clipped in place on fuel tank
- ☐ check for firm seating
- ☐ blue

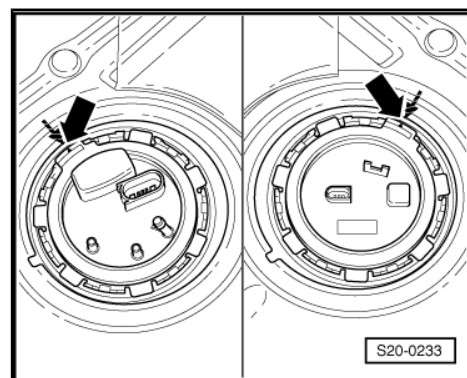
Fitting position of the flange of the fuel delivery unit with (sender for fuel gauge display -G-) and the flange of the fuel gauge sender 2 -G169-

The markings on the flanges must be aligned with markings on the fuel tank -arrows-.



Note

- ◆ *The markings on the fuel tank are hardly visible.*
- ◆ *After installing the fuel delivery unit, check whether the feed line and return-flow line are correctly clipped in place on the fuel tank.*



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1.4 Fuel filter - Summary of components

1.4.1 Fuel filter for engine with identification characters CFHC, CFHF



Note

Before disconnecting the fuel hoses, mark assignment to the supports.

1 - Return-flow hose

- ☐ to fuel tank
- ☐ blue marking and blue inscription
- ☐ is connected on the blue line on the separation point in the engine compartment on the right

2 - Intake hose

- ☐ from fuel tank
- ☐ white marking and white inscription
- ☐ is connected on the black line on the separation point in the engine compartment on the right

3 - Fuel filter - top part

- ☐ raise at the assembly groove using the offset screwdriver -VAS 6543- ➔ Maintenance ; Booklet Octavia II

4 - 5 Nm

5 - Return-flow hose

- ☐ of engine
- ☐ blue marking and blue inscription

6 - Intake hose

- ☐ to additional fuel pump
- ☐ white marking and white inscription

7 - Sealing ring

- ☐ replace

8 - Fuel filter element

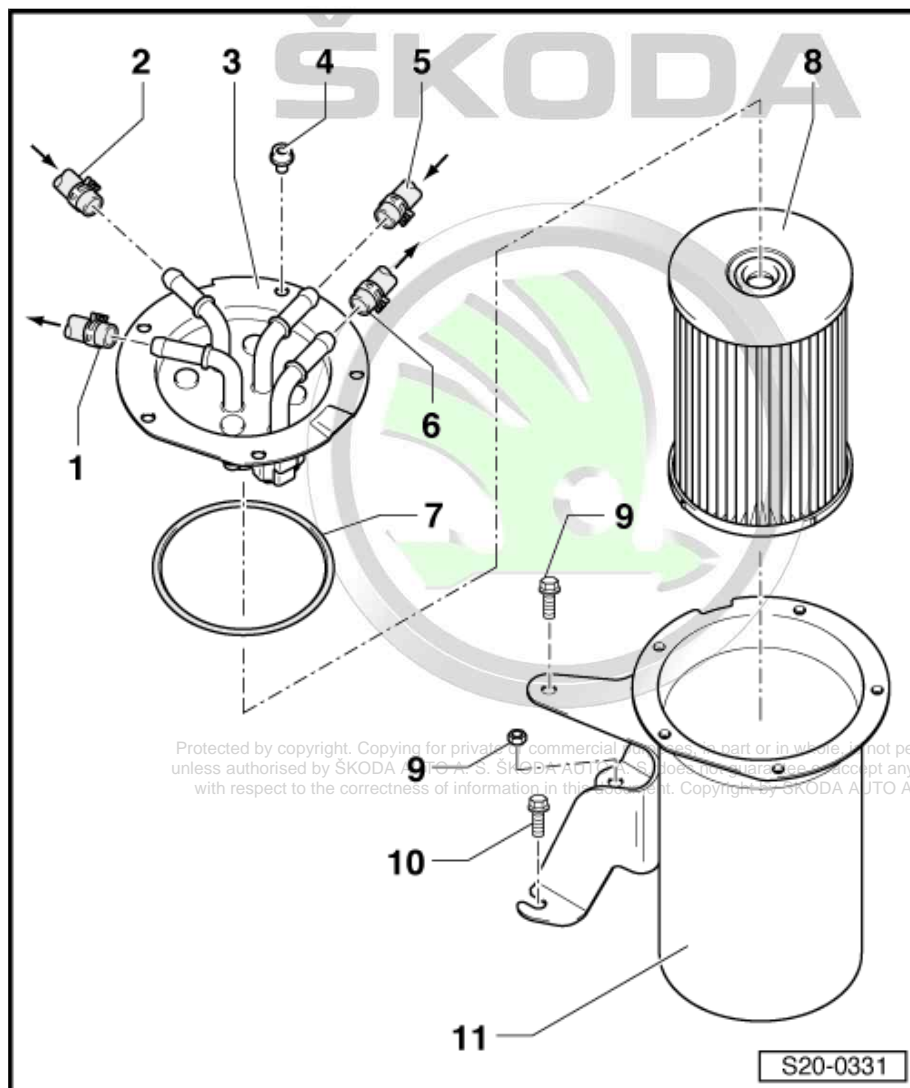
- ☐ pay attention to change intervals ➔ Maintenance ; Booklet Octavia II

9 - 8 Nm

10 - 8 Nm

- ☐ to remove the fuel filter only slacken the screw

11 - Fuel filter - bottom part with integrated bracket



1.4.2 Fuel filter for engines with identification characters CLCA, CLCB



Note

Before disconnecting the fuel hoses, mark assignment to the supports.

1 - Return-flow hose

- ☐ to fuel tank
- ☐ blue marking and blue inscription
- ☐ is connected on the blue line on the separation point in the engine compartment on the right

2 - Intake hose

- ☐ from fuel tank
- ☐ white marking and white inscription
- ☐ is connected on the black line on the separation point in the engine compartment on the right

3 - Water drain plug, 7 Nm

- ☐ Drain fuel filter ⇒ Maintenance ; Booklet Octavia II

4 - Fuel filter - top part

- ☐ raise at the assembly groove using the offset screwdriver -VAS 6543- ⇒ Maintenance ; Booklet Octavia II

5 - 5 Nm

6 - Return-flow hose

- ☐ of engine
- ☐ blue marking and blue inscription

7 - Intake hose

- ☐ to additional fuel pump -V393-
- ☐ white marking and white inscription

8 - Sealing ring

- ☐ replace

9 - Fuel filter element

- ☐ Change intervals ⇒ Maintenance ; Booklet Octavia II

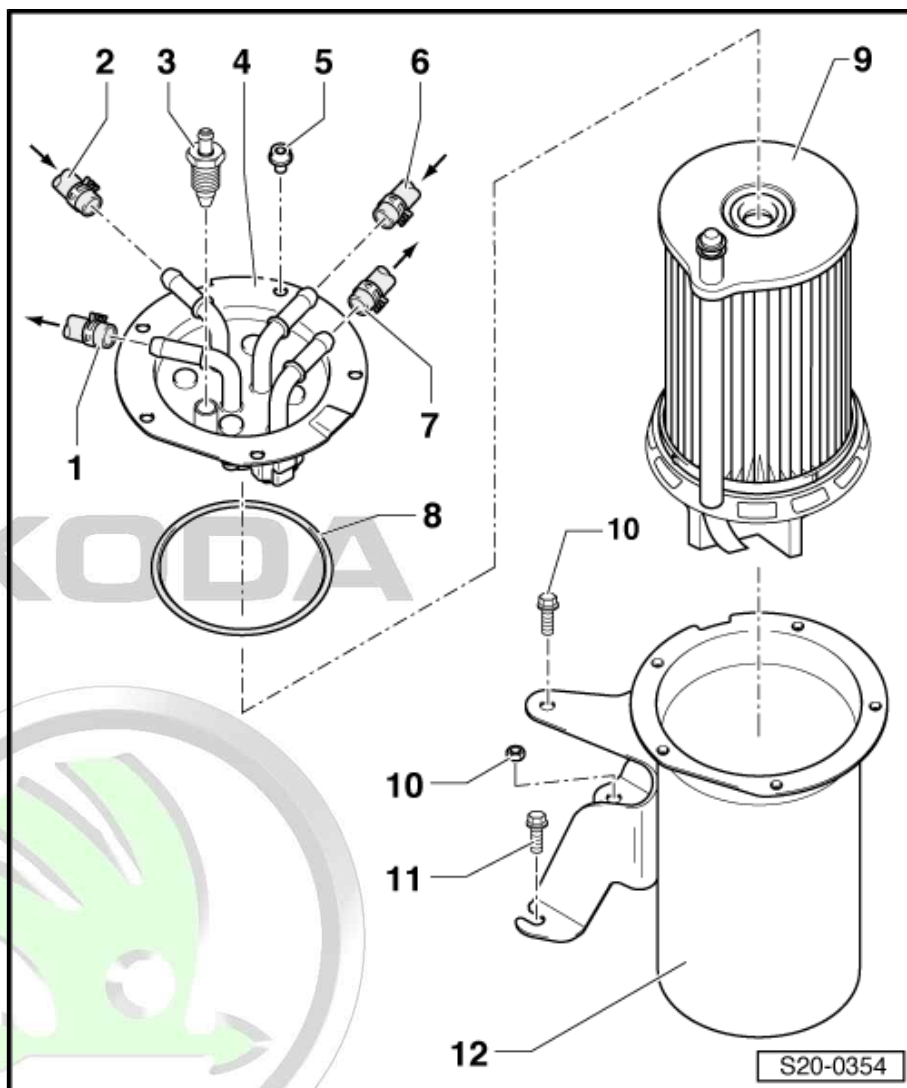
10 - 8 Nm

11 - 8 Nm

- ☐ to remove fuel filter only slacken screw and do not release

12 - Fuel filter - bottom part

- ☐ with integrated bracket





1.5 Extract fuel from the fuel tank

Special tools and workshop equipment required

- ◆ Hose adapter , e.g. -V.A.G 1318/16-
- ◆ Adapter , e.g. -V.A.G 1318/17-
- ◆ Measuring tool set , e.g. -V.A.G 1594 C-
- ◆ Battery
- ◆ Fuel tank



Note

If the fuel pump is defective, suction off fuel using a fuel suction device , e.g. -VAS 5190- .

Work procedure



Note

- ◆ *Safety precautions when working on the fuel supply system*
⇒ [page 3](#) .
- ◆ *Observe rules for cleanliness ⇒ [page 4](#) .*
- Switch off ignition and withdraw ignition key.
- Removing rear seat bench ⇒ Body Work ⇒ Rep. gr. 72 .
- Unclip retaining catches -arrows- of cover for the fuel delivery unit and remove cover.



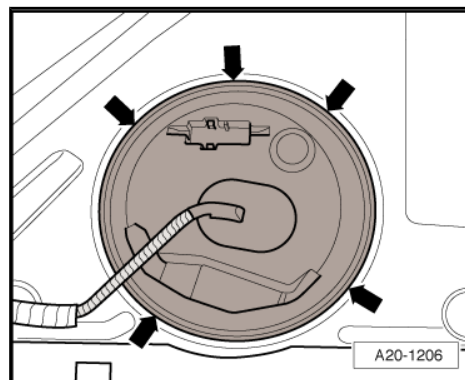
Note

For vehicles with auxiliary heating, the plug connection for the dosing pump -V54- must be disconnected additionally.



WARNING

The fuel feed line is pressurized! Wear safety goggles and safety clothing, in order to avoid injuries and skin contact with fuel. Place cleaning cloths around the connection point before detaching cable connections. Reduce pressure by carefully removing the wiring.

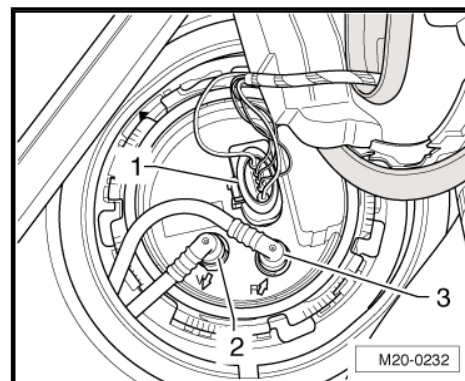


Note

Press in the securing ring in order to unlock the fuel line.

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- Unplug the 5-pin connector -1- and the black feed line -2-.



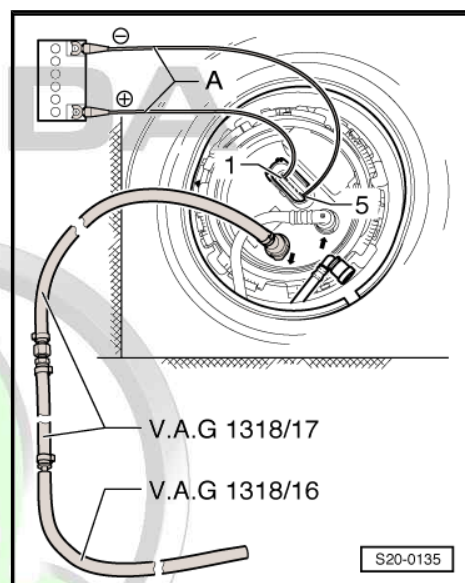
- Connect the adapter set -V.A.G 1318/17- and the hose adapter -V.A.G 1318/16- and fit the resulting „drain pipe“ onto the feed support of the fuel delivery unit.
- Hold the „drain pipe“ in a suitable fuel tank.
- Connect the battery and the contacts of the fuel pump with adapter cables -A- from the adapter cable set as follows:
 - ◆ Battery positive terminal (+) to contact -1- of the fuel pump.
 - ◆ Battery negative terminal (-) to contact -5- of the fuel pump.

The fuel pump runs and suctions off fuel.



WARNING

In order to prevent an overflow of fuel, the fuel pump must not run unattended.



1.6 Removing and installing the fuel delivery unit on vehicles with front-wheel drive

Special tools and workshop equipment required

- ◆ Key -T30101 (3087)-
- ◆ Protective gloves

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Removing

- The fuel tank must not be more than $\frac{3}{4}$ full.



Note

- ◆ If necessary drain the fuel tank ⇒ [page 142](#) .
- ◆ Safety precautions when working on the fuel supply system ⇒ [page 3](#) .
- ◆ Observe rules for cleanliness ⇒ [page 4](#) .
- Switch off ignition and withdraw ignition key.
- Removing rear seat bench ⇒ Body Work ⇒ Rep. gr. 72 .

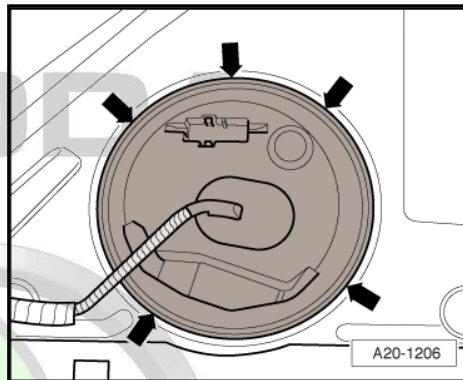


- Unclip retaining catches -arrows- of cover for the fuel delivery unit and remove cover.



Note

For vehicles with auxiliary heating, the plug connection for the dosing pump -V54- must be disconnected additionally.

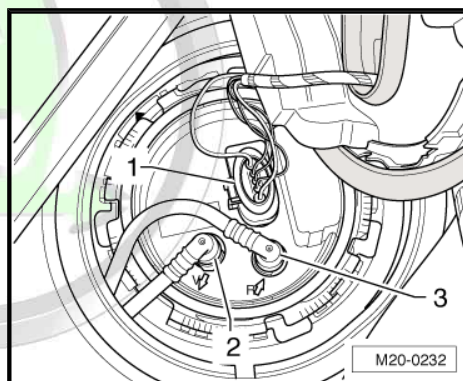


- Unplug the 5-pin plug -1-, the black feed line -2- and blue return-flow line -3- abziehen.



Note

- ◆ Press in the securing ring in order to unlock the fuel line.
- ◆ For vehicles with auxiliary heating the suction line for the dosing pump -V54- must be pulled out additionally (open lower clamp).



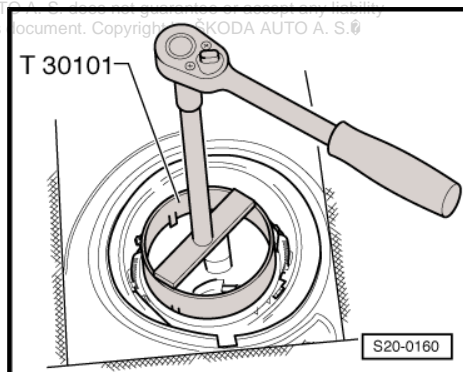
- Slacken lock ring with the wrench -T30101-.



Note

When removing and installing, ensure that the float arm of the sender for fuel gauge display -G- is not bent.

- Pull the fuel delivery unit and the gasket ring out of the opening of the fuel tank.



Note

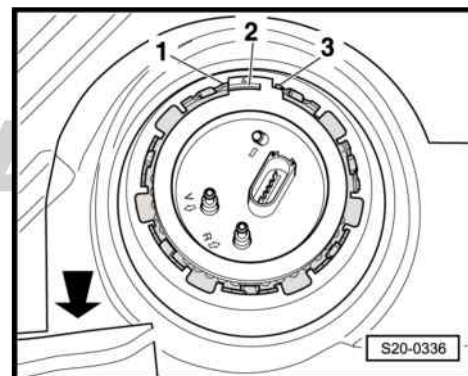
You must empty the old fuel delivery unit before disposing of it if you wish to replace it.

Install

- Installation is performed in the reverse order, pay attention to the following points:

i Note

- ◆ Insert new dry gasket ring into the opening of the fuel tank.
- ◆ The gasket ring must only be moistened on the inside with fuel before assembly of the fuel delivery unit.
- ◆ When installing, do not bend the sender for fuel gauge display.
- ◆ Observe the fitting location of the fuel delivery unit. The marking -3- on the flange must point against the direction of travel. The fuel delivery unit can only be installed in this position.
- ◆ Do not interchange feed line and return-flow line.
- ◆ Tighten the lock ring to a tightening torque ➔ [page 135](#).
- ◆ Make sure the line connections fit tightly.
- ◆ After installing the fuel delivery unit, check whether the feed line and return-flow line are correctly clipped in place on the fuel tank.



1.7 Removing and installing the fuel delivery unit on vehicles with four-wheel drive

Special tools and workshop equipment required

- ◆ Key -T30101 (3087) -

Removing

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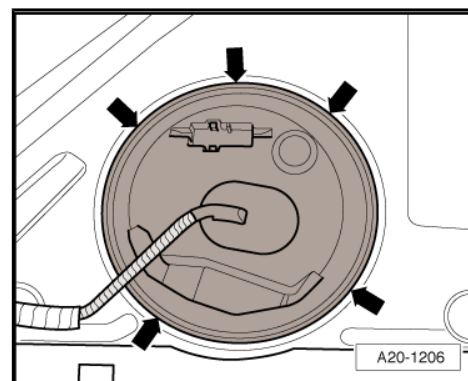
- The fuel tank must not be more than $\frac{3}{4}$ full.

i Note

- ◆ Safety precautions when working on the fuel supply system ➔ [page 3](#).
- ◆ Observe rules for cleanliness ➔ [page 4](#).
- Switch off ignition and withdraw ignition key.
- Empty the fuel tank if necessary ➔ [page 142](#).
- Fold up rear seat.
- Unclip retaining catches -arrows- of cover for the fuel delivery unit and remove cover.

i Note

For vehicles with auxiliary heating, the plug connection for the dosing pump -V54- must be disconnected additionally.



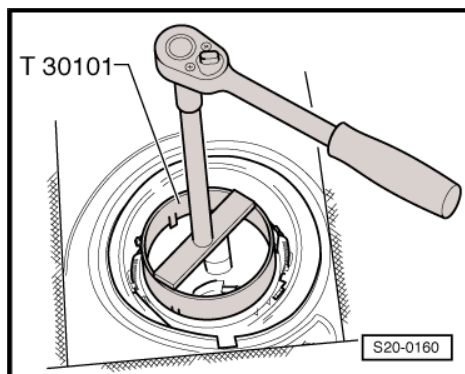
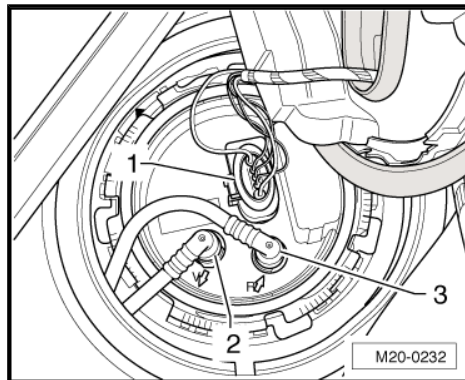


- Unplug the 5-pin plug -1-, the black feed line -2- and blue re-
turn-flow line -3- abziehen.



Note

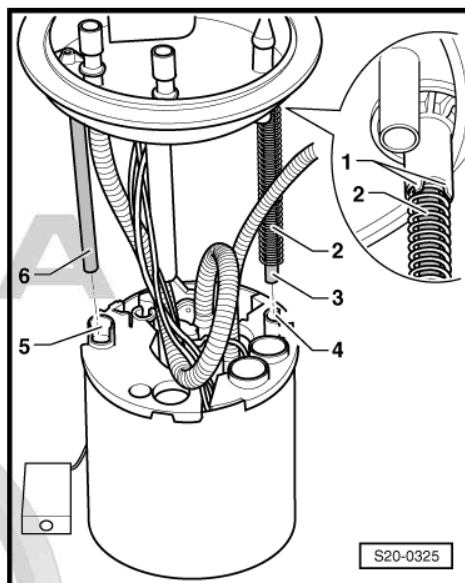
- ◆ Press in the securing ring in order to unlock the line.
 - ◆ For vehicles with auxiliary heating the suction line for the dos-
ing pump -V54- must be pulled out additionally (open lower
clamp).
- Open lock ring with the wrench -T30101- .



- Slightly raise the closing flange and check if the spring -2- is
still fastened on the flange -1-.

If the spring -2- is loose on the guide pipe -3-, hold it with your
fingers while removing the closing flange.

- Pull out closing flange and gasket ring of the fuel delivery unit
from the opening of the fuel tank and place to the side with the
connected lines.



- Separate through the opening of the fuel tank the fuel line -1- to the suction jet pump, to do so press the release button.
- Separate the fuel delivery line -2- from the fuel delivery unit.



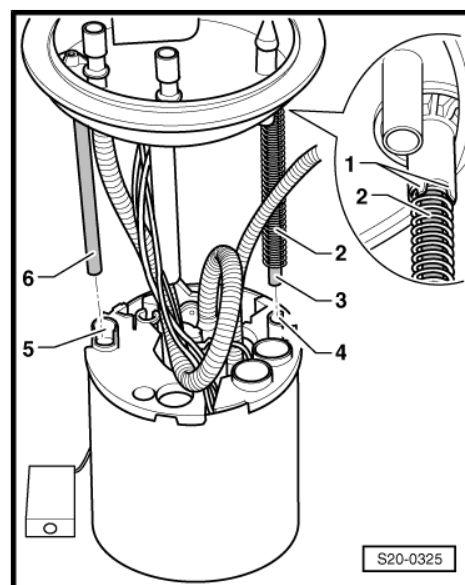
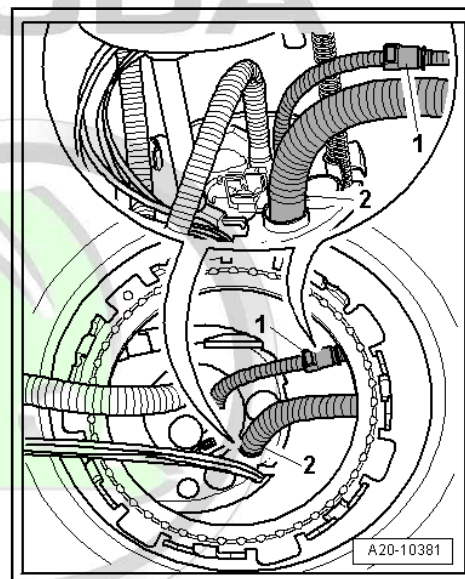
Note

- ◆ *You must wear protective gloves for removing the fuel delivery unit.*
 - ◆ *Take the fuel delivery unit out of the fuel tank in such a way that the electrical cables and the fuel hoses are not damaged and that the float arm of the sender for the fuel gauge display -G- is not bent.*
 - ◆ *You must empty the old fuel delivery unit before disposing of it if you wish to replace it.*
- Pull the fuel delivery unit out of the opening of the fuel tank.

Install

The fuel delivery unit is installed in the reverse order. However, pay attention to the following:

- Insert the fuel delivery unit into the fuel tank with the closing flange placed to the side. Thus, do not bend the float arm of the fuel gauge sender unit -G-.
- Install the fuel delivery unit and the fuel line.
- Insert the new dry gasket ring into the opening of the fuel tank and moisten only from the inside with fuel for installing the closing flange.
- The spring -2- must be fastened to the retaining lugs -1- of the closing flange.
- First of all guide the guide pipe -3- into the guide bore -4-.
- Then lower the closing flange in such a way that the guide pipe -6- locks into the guide bore -5-.





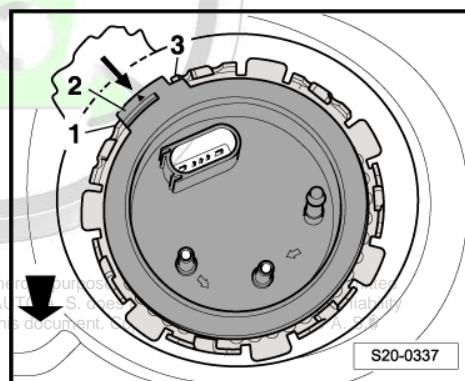
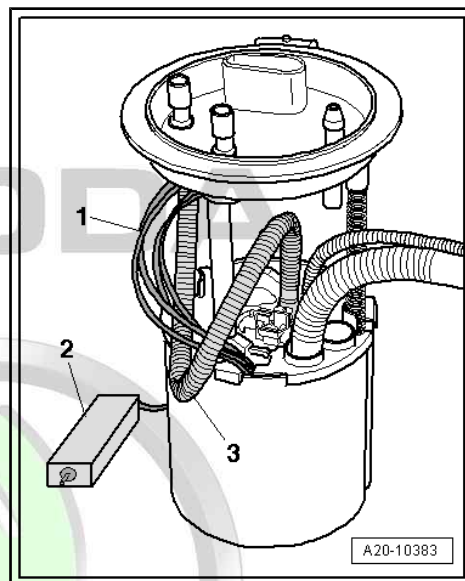
Note

Pay attention that the electrical cables -1- and the fuel feed line -3- are routed according to the illustration and the float arm -2- is not blocked.

- Press the closing flange down and bring it into the installation position.

Further information:

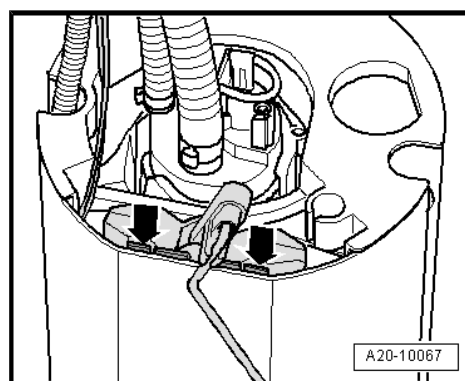
- ◆ Fitting position of the fuel delivery unit: The peg -2- at the closing flange must be located between the pegs -1- and -3-. The -thick arrow- points in the direction of travel.
- ◆ Tighten the lock ring to 110 Nm.
- ◆ Do not interchange feed line and return-flow line.
- ◆ Make sure the fuel lines fit tightly.
- ◆ After installing the fuel delivery unit, check whether the feed line and the return-flow line are still clipped in place on the fuel tank.



1.8 Removing and installing the sender for fuel gauge display -G-

Removing

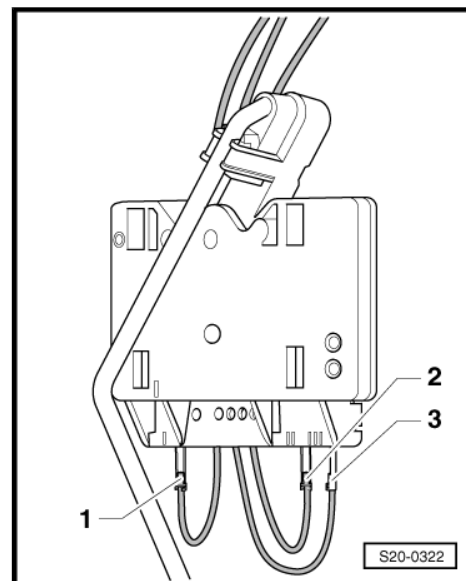
- Remove fuel delivery unit ➔ [page 143](#).
- Unlock the catches -arrows- using a screwdriver and pull out the sender for the fuel gauge display -G- towards the top.



- Unlatch and disconnect the plugs of the electrical cables -1- (brown), -2- (blue) and -3- (black).

Install

- Connect the wiring and check correct installation of the plug.
- Insert the sender for fuel gauge display -G- in the guides at the fuel delivery unit and press downwards until it latches into position.
- Install fuel delivery unit ➔ [page 143](#) .



1.9 Removing and installing fuel gauge sender 2 -G169-

- The fuel tank must not be more than $\frac{1}{2}$ full.



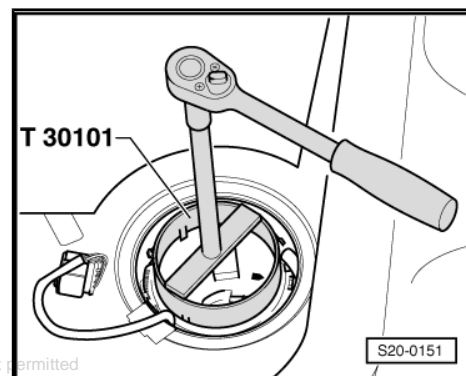
Note

- ◆ Empty the fuel tank if necessary ➔ [page 142](#) .
- ◆ Safety precautions when working on the fuel supply system ➔ [page 3](#) .
- ◆ Observe the regulations concerning cleanliness when working on the fuel supply/injection system ➔ [page 4](#) .
- ◆ Make sure that the fuel gauge sender is not tilted.

Removing

Switch off ignition and withdraw ignition key.

- Removing rear seat bench ➔ Body Work ➔ Rep. gr. 72 .
- Remove left cover and disconnect plug from fuel gauge sender 2 -G169- .
- Unlock lock ring from flange with wrench -T30101- .



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- Slightly pull fuel gauge sender 2 -G169- out of the opening of the fuel tank, unlock securing tabs -arrows- and disconnect suction jet pump.

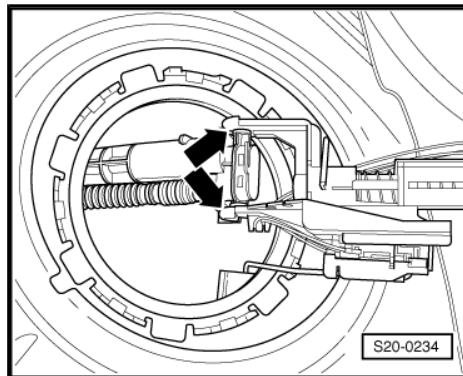
Install

- Installation is carried out in the reverse order. Pay attention to the following:

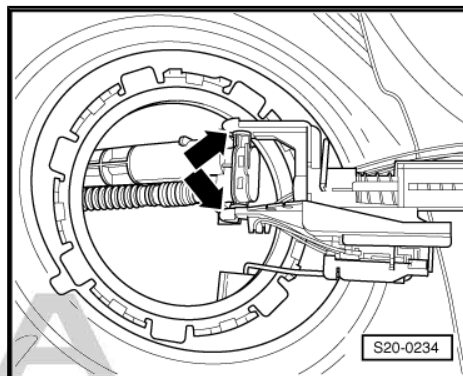


WARNING

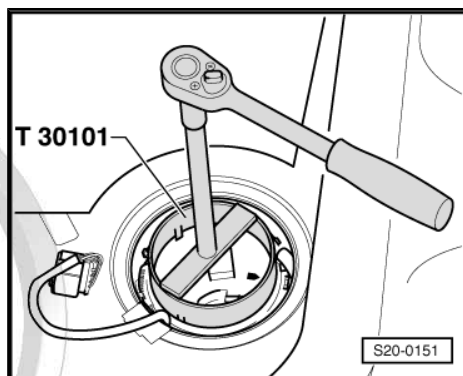
When installing do not bend the float arm of the fuel gauge sender 2 -G169- .



- Insert the fuel gauge sender 2 -G169- into the fuel tank.
- Fit the suction jet pump in the fuel tank onto the fuel gauge sender 2 -G169- and push it in until the securing tabs -arrows- latch into position.
- Insert new dry gasket ring of the flange into the opening of the fuel tank and only moisten the inside (towards flange) with fuel.
- Check the fitting position ➤ [page 139](#) and insert the flange of the fuel gauge sender 2 -G169- into the opening of the fuel tank.
- Check correct seating of the gasket ring.



- Tighten the lock ring with wrench -T30101- to 110 Nm.
- Fit on plug and install left cover.



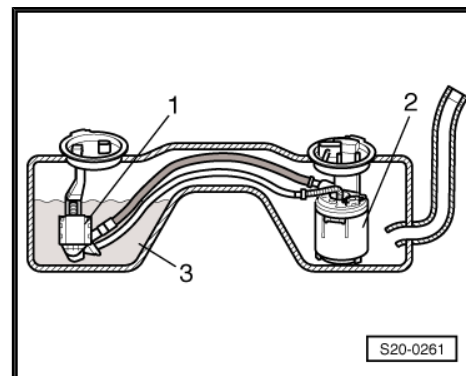
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1.10 Removing and installing suction jet pump



Note

- ◆ The fuel tank consists of a left and right chamber. In order to pump the fuel out of the left chamber -3- of the fuel tank into the right chamber to the housing of the fuel delivery unit -2-, a suction jet pump -1- is required.
- ◆ The version of the fuel tank requires that the fuel is pumped from the area of the fuel gauge sender 2 -G169- with a suction jet pump to the fuel delivery unit.
- ◆ A check is only to be carried out, if the engine stops because of fuel shortage, although the fuel gauge still indicates a fuel tank which is $\frac{1}{4}$ full.



Work procedure

- Remove fuel delivery unit ➔ [page 143](#) .
- Remove fuel gauge sender 2 -G169- ➔ [page 149](#) .
- Now the suction jet pump can be pulled out from the side of the fuel gauge sender 2 -G169- (on left in direction of travel).
- Check if the fuel lines are firmly connected to the suction jet pump and are not damaged.
- Check the suction jet pump additionally for possible contamination.

1.11 Remove and install the fuel tank for vehicles with front-wheel drive

Special tools and workshop equipment required

- ◆ Engine/gearbox jack , e.g. -V.A.G 1383 A-

Removing

- The fuel tank must be empty for weight reasons when removing it, if necessary suction the fuel out of the fuel tank ➔ [page 142](#) .



Note

- ◆ Drain the fuel tank ➔ [page 142](#) .
- ◆ Safety precautions when working on the fuel supply system ➔ [page 3](#) .
- ◆ Observe the regulations concerning cleanliness when working on the fuel supply/injection system ➔ [page 4](#) .

- Switch off ignition and withdraw ignition key.
- Removing rear seat bench ➔ Body Work ➔ Rep. gr. 72 .

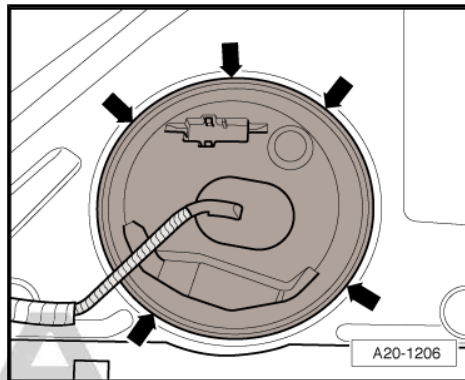


- Unclip retaining catches -arrows- of cover for the fuel delivery unit and remove cover.

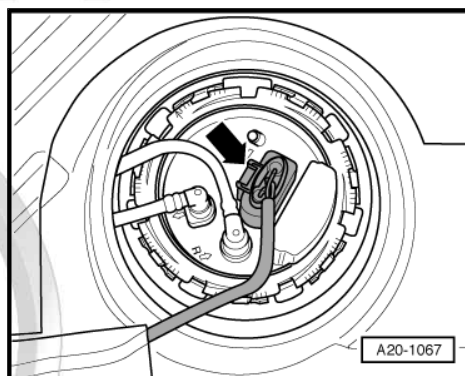


Note

For vehicles with auxiliary heating, the plug connection for the dosing pump -V54- must be disconnected additionally.

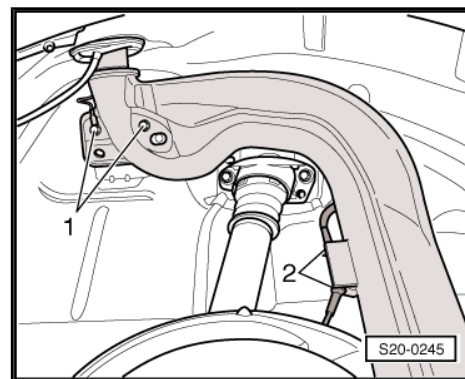


- Unplug the 5-pin plug -arrow- from the fuel delivery unit.
- Open the fuel tank cap and clean around the fuel filler neck.
- Unscrew the cap from the fuel filler neck.
- Close the opening of the fuel filler neck with a clean foam piece, so that no dirt can penetrate.
- Remove right rear wheel ⇒ Chassis ⇒ Rep. gr. 44 .
- Remove the rear right wheelhouse liner ⇒ Body Work ⇒ Rep. gr. 66 .



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- Unscrew screws -1- for filler neck on the body.
- Unclip the wiring loom from the holder -2- at the top and bottom of the filler neck.
- Remove rear tunnel bridge ➔ [page 222](#) .
- Slacken front double clamp at exhaust pipe and push to the rear.
- Loosen the middle and rear part of the exhaust system from all the retaining straps.
- Slightly lower the middle and rear part of the exhaust system and tie with wire to the body.
- Disconnect the fuel feed line and the fuel return-flow line on the front right of the fuel tank.



Note

- ◆ *For vehicles with auxiliary heating, the fuel line of the dosing pump -V54- must also be disconnected.*
- ◆ *Press down the securing rings in order to unlock the connections of the fuel lines.*
- Unscrew tensioning strap.
- Support fuel tank using the engine/gearbox jack -V.A.G 1383 A- .
- Unscrew securing bolts.
- Lower the fuel tank.

Install

Installation occurs in reverse order to removal. Pay attention to the following:

- ◆ Lay the fuel lines avoiding any kinks.
- ◆ Do not mix-up the fuel feed line (black) and the fuel return-flow line (blue).
- ◆ Make sure the line connections fit tightly.
- ◆ Check feed line and return-flow line at fuel tank for firm seating.
- ◆ Check earth connection of fuel tank/body at filler neck.

1.12 Removing and installing fuel tank for vehicles with four-wheel drive

Special tools and workshop equipment required

- ◆ Engine/gearbox jack , e.g. -V.A.G 1383 A-
- The fuel tank must be empty for weight reasons when removing it, if necessary suction the fuel out of the fuel tank ➔ [page 142](#) .

Removing



Note

- ◆ *Safety precautions when working on the fuel supply system ➔ [page 3](#) .*
- ◆ *Observe rules for cleanliness ➔ [page 4](#) .*

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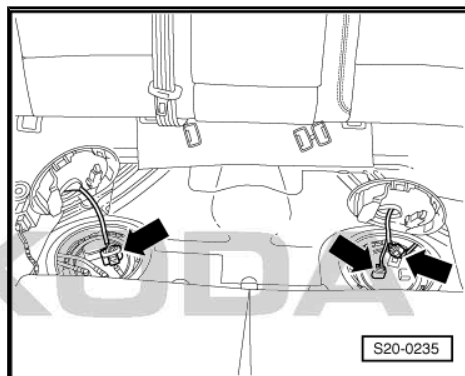
- Switch off all electrical components and withdraw key from ignition lock.
- Remove rear seat bench with brackets ⇒ Body Work ⇒ Rep. gr. 72 .
- Remove floor covering under the rear seat bench.
- Remove the cover from the fuel delivery unit and the cover for the flange with the fuel gauge sender 2 -G169- .



Note

For vehicles with auxiliary heating, the plug connection for the dosing pump -V54- must be disconnected additionally.

- Disconnect the plug for the fuel delivery unit and the flange with the fuel gauge sender 2 -G169- -arrows-.
- Open the fuel tank cap and clean around the fuel filler neck.
- Unscrew the cap from the fuel filler neck.
- Close the opening of the fuel filler neck with a clean foam piece, so that no dirt can penetrate.
- Remove right rear wheel ⇒ Chassis ⇒ Rep. gr. 44 .
- Remove the rear right wheelhouse liner ⇒ Body Work ⇒ Rep. gr. 66 .

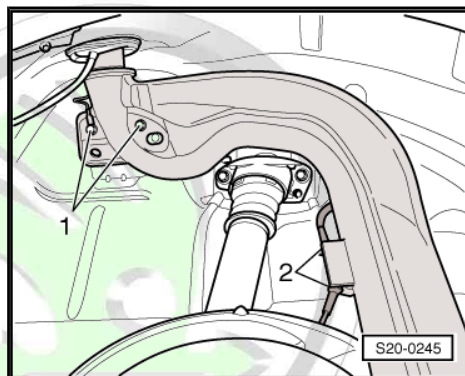


- Unscrew screws -1- for filler neck on the body.
- Unclip the electrical cable from the bracket -2- at the top and bottom of the filler neck.

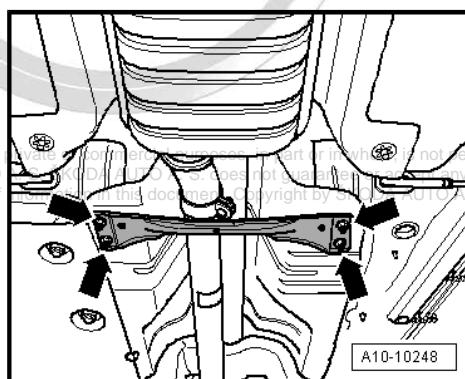


Note

- ◆ *For vehicles with auxiliary heating, the fuel line of the dosing pump -V54- must also be disconnected.*
- ◆ *Press down the securing rings in order to unlock the connections of the fuel lines.*

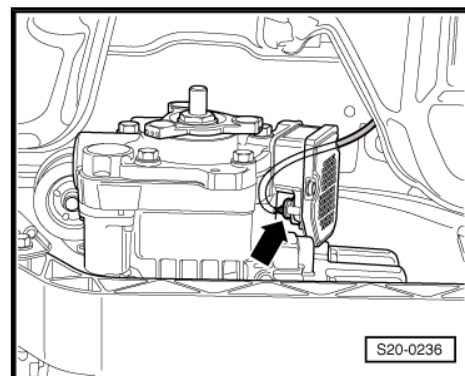


- Remove tunnel bridge -arrows-.
- Remove rear part of exhaust system ⇒ [page 231](#) .
- Remove propshaft ⇒ Gearbox ⇒ Rep. gr. 39 .

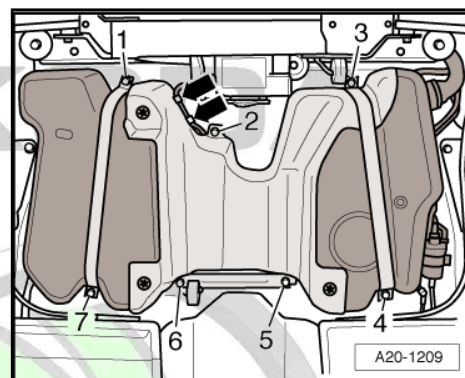


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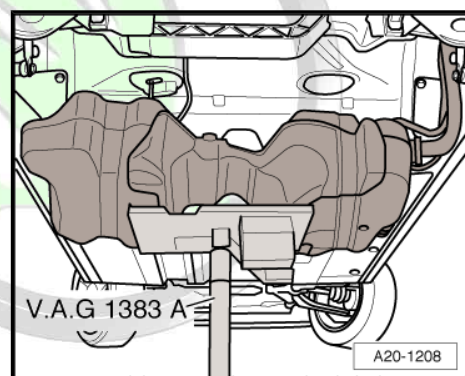
- Disconnect plug -arrow- at four-wheel drive control unit - J492- .



- First unscrew screws -2, 5- and -6-.
- Support the fuel tank using the engine/gearbox jack -V.A.G 1383 A- .
- Screw out the screws for the tensioning straps -1, 3, 4- and -7-.



- Lower slightly the fuel tank using the engine/gearbox jack - V.A.G 1383 A- .
- Then remove the fuel tank from the engine/gearbox jack - V.A.G 1383 A- and pull through the filler neck between the body and the rear axle with the help of a second mechanic.



Install

Installation occurs in reverse order to removal. Pay attention to the following:

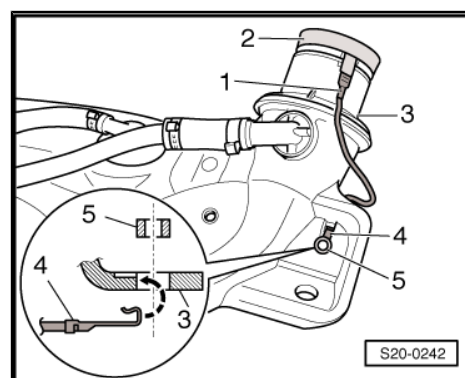


Note

- ◆ Lay the fuel lines avoiding any kinks.
- ◆ Do not mix-up the fuel feed line (black) and the fuel return-flow line (blue).
- ◆ Make sure the line connections fit tightly.
- ◆ Check feed line and return-flow line at fuel tank for firm seating.

- Check earth connection of fuel tank/body at filler neck and if necessary remove corrosion.
- The plug -1- on the metal plate ring -2- must be pushed on firmly.
- The contact tab -4- must be hung on the fuel tank -3- and secured with the spacer bush -5-.
- Pull through the filler neck between the body and the rear axle with the help of a second mechanic. Then position the fuel tank onto the engine/gearbox jack -V.A.G 1383 A- .

Tightening torques: ➔ [page 138](#)





1.13 Testing fuel pump

1.13.1 Checking function and voltage supply of fuel pump

Special tools and workshop equipment required

- ♦ Measuring tool set , e.g. -V.A.G 1594 C-

Test conditions

- Battery voltage at least 12 V.
- Fuses o.k. ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- All electrical consumers such as the light and rear window heater must be switched off.

Test sequence



Note

- ♦ *Safety precautions when working on the fuel supply system*
⇒ [page 3](#) .
- ♦ *Observe rules for cleanliness* ⇒ [page 4](#) .
- Removing rear seat bench ⇒ Body Work ⇒ Rep. gr. 72 .
- Unclip retaining catches -arrows- of cover for the fuel delivery unit and remove cover.



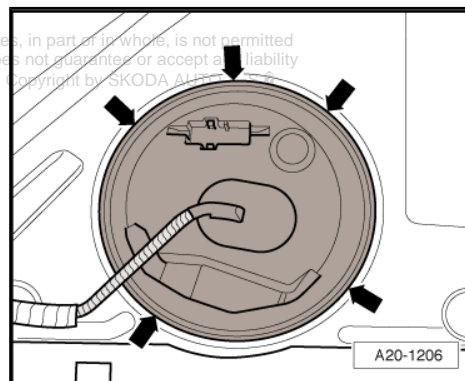
Note

For vehicles with auxiliary heating, the plug connection for the dosing pump -V54- must be disconnected additionally.

- Switch on ignition.
- The fuel pump must be heard to start running.
- Switch off ignition.

If the fuel pump does not run:

- Continuing searching for faults using a multimeter ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.



1.13.2 Test feed pressure of fuel pump

Special tools and workshop equipment required

- ♦ Pressure gauge , e.g. -V.A.G 1318-
- ♦ Adapter , e.g. -V.A.G 1318/17A-

Test conditions

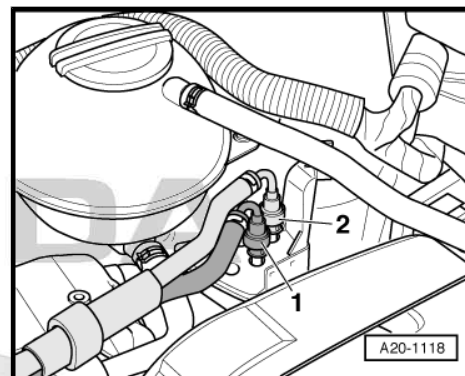
- Battery voltage at least 12 V.
- Fuses o.k. ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- All electrical consumers such as the light and rear window heater must be switched off.

Test sequence



Note

- ◆ *Safety precautions when working on the fuel supply system*
⇒ [page 3](#).
- ◆ *Observe rules for cleanliness* ⇒ [page 4](#).
- Separate fuel feed line -2-, to do so press in securing ring.



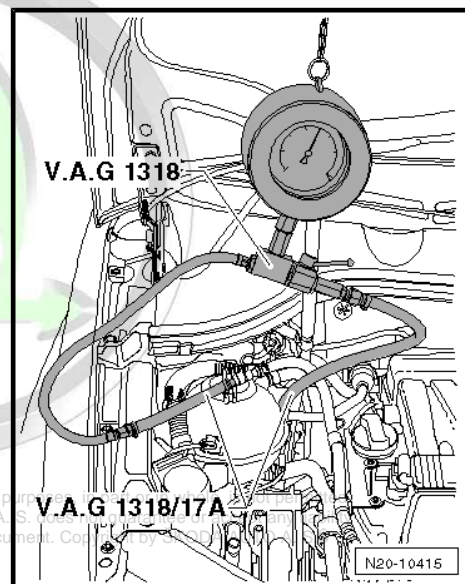
- Connect the pressure gauge -V.A.G 1318- with the adapter set -V.A.G 1318/17A- to the open ends of the fuel feed line (the illustration shows a different engine).
- Open shut-off cock of the pressure gauge.
- Start engine and run in idle.
- Read the pressure on the pressure gauge -V.A.G 1318- .
 - Specified value: min. 0,05 MPa (0,5 bar)
- Increase the engine speed to 2 500 rpm and read the pressure on the pressure gauge -V.A.G 1318- .
 - Specified value: min. 0,025 MPa (0,25 bar)

If the specified value is not reached or the pressure fluctuates:

- Replace fuel delivery unit.

If the specified value is reached:

- Replace the fuel filter in order to prevent a fuel filter from being blocked.
- Check the fuel flow rate of the fuel pump ⇒ [page 157](#) .



1.13.3 Check the fuel flow rate of the fuel pump

Special tools and workshop equipment required

- ◆ Remote control , e.g. -V.A.G 1348/3A-
- ◆ Measuring tool set , e.g. -V.A.G 1594C-
- ◆ Adapter , e.g. -V.A.G 1318/16-
- ◆ Adapter , e.g. -V.A.G 1318/17-
- ◆ Measuring vessel

Test conditions

- Battery voltage at least 12 V.
- Fuel temperature 15...30°C.
- Fuel tank must be at least $\frac{1}{4}$ full.



Test sequence



Note

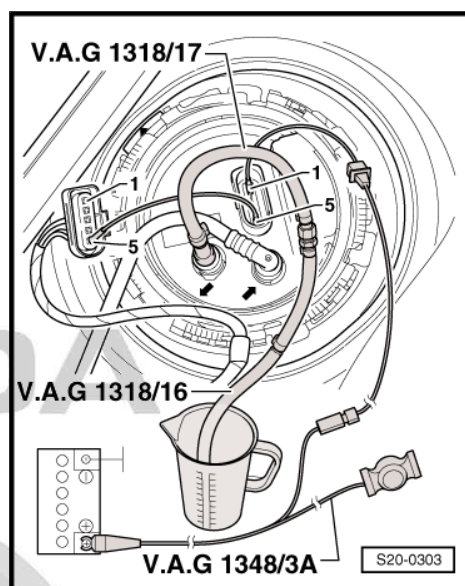
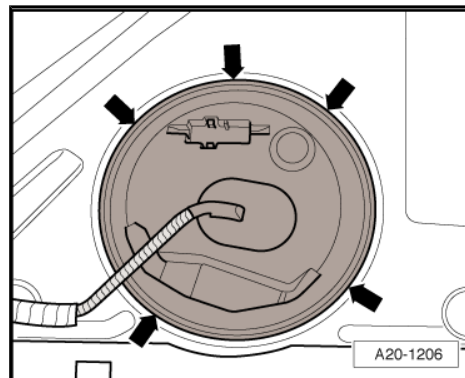
- ◆ *Safety precautions when working on the fuel supply system*
⇒ [page 3](#) .
- ◆ *Observe rules for cleanliness* ⇒ [page 4](#) .
- Unscrew the cap from the fuel filler neck.
- Removing rear seat bench ⇒ Body Work ⇒ Rep. gr. 72 .
- Unclip retaining catches -arrows- of cover for the fuel delivery unit and remove cover.



Note

For vehicles with auxiliary heating, the plug connection for the dosing pump -V54- must be disconnected additionally.

- Unplug the 5-pin plug from the fuel delivery unit.
- Connect remote control -V.A.G 1348/3A- with connection lines from measuring tool set to contact -1- of the fuel pump and to battery positive terminal.
- Use connection lines from the measuring tool set to connect the contacts -5- to the plug and to the fuel pump.
- Pull off the fuel feed line from the flange of the fuel delivery unit.
- Connect adapter -V.A.G 1318/17- and adapter -V.A.G 1318/16- , fit onto the feed support and hold the other end in a measuring glass.
- Activate the remote control -V.A.G 1348/3A- for 30 seconds.
- Measure the battery voltage.



- Compare the fuel rate with the specified value.



Note

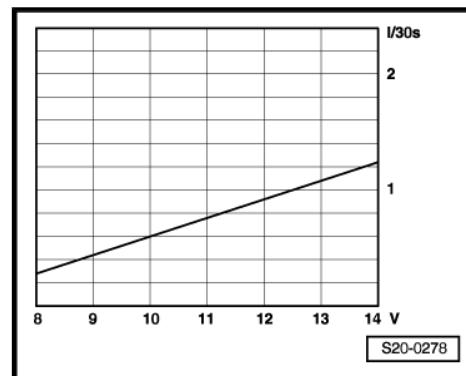
- ◆ The amount of the fuel pumped is dependent on the voltage at the fuel pump.
- ◆ The diagram refers to the existing voltage at the fuel pump which is about 2 V less than the battery voltage.

If the minimum delivery volume is not reached:

- Remove the fuel pump and check whether the pump strainer is not clogged up.

If no fault was detected:

- Replace fuel delivery unit ➔ [page 143](#) .



1.13.4 Check voltage consumption of the fuel pump

Special tools and workshop equipment required

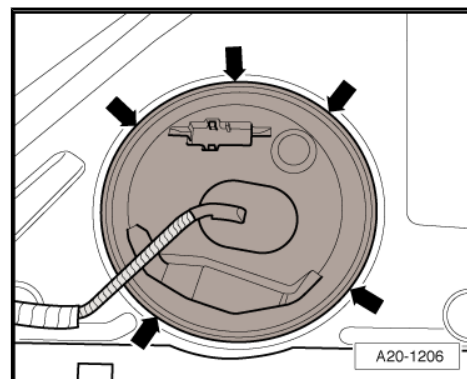
- ◆ Vehicle diagnosis, measurement and information system -VAS 5051-

- Removing rear seat bench ➔ Body Work ➔ Rep. gr. 72 .
- Unclip retaining catches -arrows- of cover for the fuel delivery unit and remove cover.



Note

For vehicles with auxiliary heating, the plug connection for the dosing pump -V54- must be disconnected additionally.

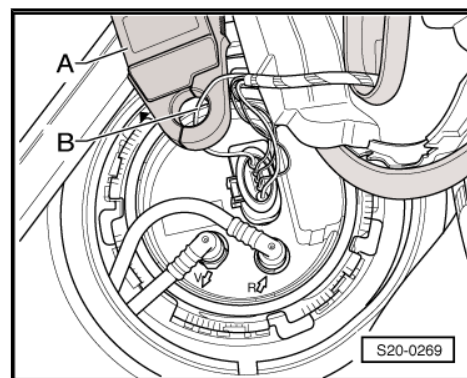


- Connect the current probe -A- of the vehicle diagnosis, measurement and information system -VAS 505X- on the line -B- to contact 1 of the 5-pin plug.
- Start engine and run in idle.
- Measure voltage consumption of the fuel pump.

Specified value: max. 7.5 A

If the power consumption is exceeded, the fuel pump is defective.

- Replace fuel delivery unit ➔ [page 143](#) .





1.14 Removing and installing additional fuel pump -V393-



Note

- ◆ *Safety precautions when working on the fuel supply system*
⇒ [page 3](#) .
- ◆ *Observe rules for cleanliness* ⇒ [page 4](#) .
- ◆ *The additional fuel pump -V393- is only supplied as a spare part complete with the bracket.*

Removing

Engine with identification characters CFHC, CFHF

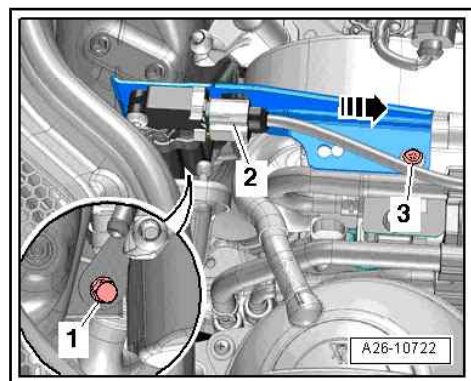
- Disconnect plug -2- at differential pressure indicator -G505- .
- Screw out screw -3- and remove bracket with differential pressure indicator -G505- from the bracket of the additional fuel pump in -direction of arrow-.



Caution

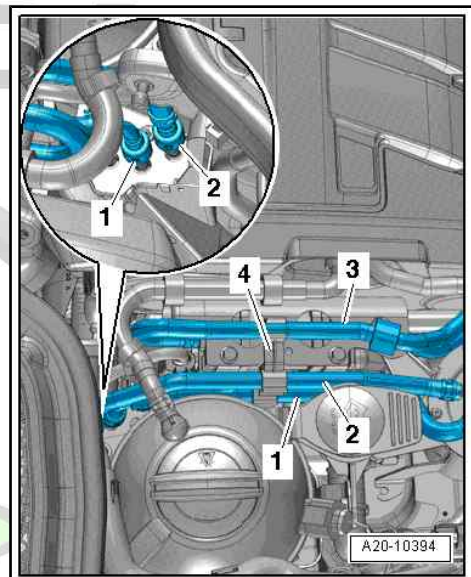
Risk of damage!

- ◆ *The differential pressure indicator -G505- is very sensitive. It must not touch somewhere when laying it down.*

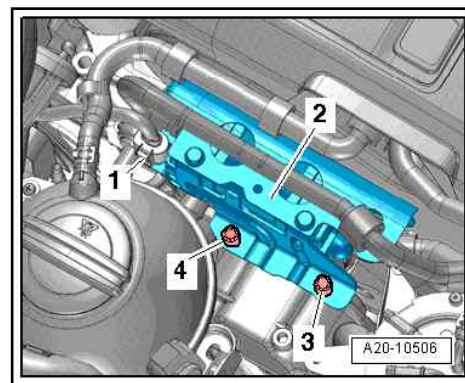


- Place the bracket with the differential pressure indicator -G505- to the rear.
- Unhook the fuel hoses -1, 2, 3- on the bracket and remove the bracket -4-.

Continued for all engines



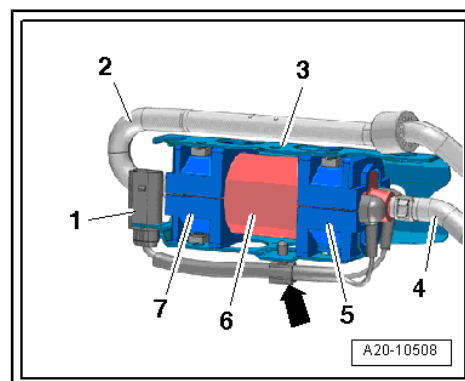
- Unplug connector -1-.
- Unscrew screws -3- and -4- and remove bracket -2- with additional fuel pump.



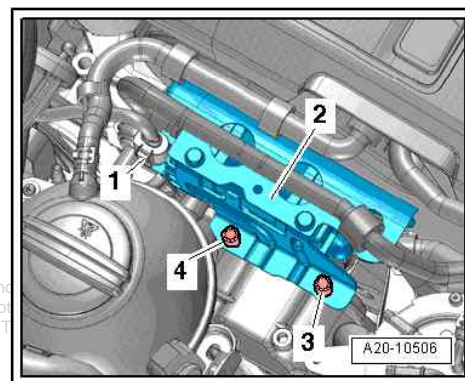
- Open the spring strap clamps and remove the fuel hoses -2- and -4-.

Install

Installation is performed in the reverse order, pay attention to the following points:



- Tighten screws -3- and -4- to 20 Nm.
- After replacing the additional fuel pump -V393-, fill up the fuel system ➤ [page 189](#).



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2 Accelerator control

2.1 Accelerator pedal module - Summary of components

1 - Connector

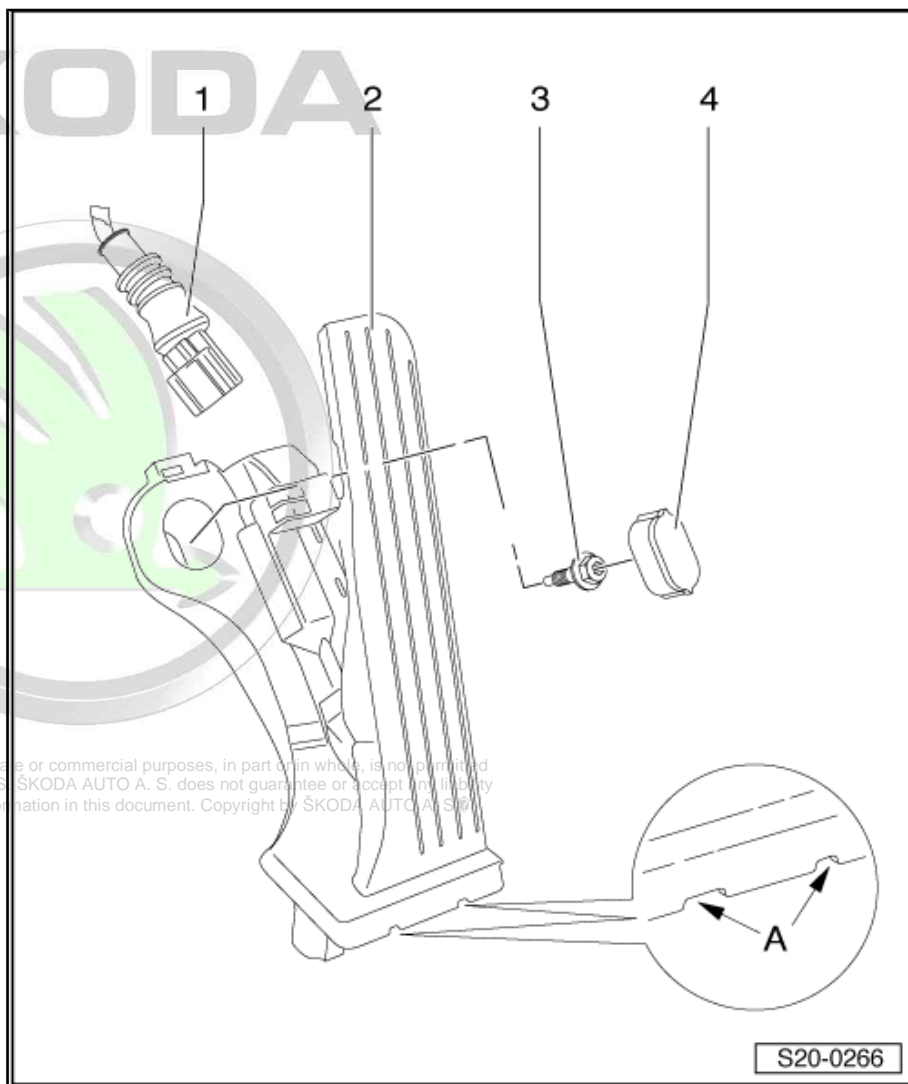
- ☐ black
- ☐ 6-pin
- ☐ disconnect and fit on
⇒ [page 164](#)

2 - Accelerator pedal module

- ☐ with accelerator pedal position sender -G79- and accelerator pedal position sender 2 -G185-
- ☐ -A- openings for release tool -T10238- or -T10240-
- ☐ not adjustable
- ☐ removing and installing
⇒ [page 162](#)
- ☐ when replacing, the engine control unit must be adapted ⇒ Vehicle diagnostic, testing and information system VAS 5051 on vehicles with automatic gearbox

3 - 10 Nm

4 - Cap



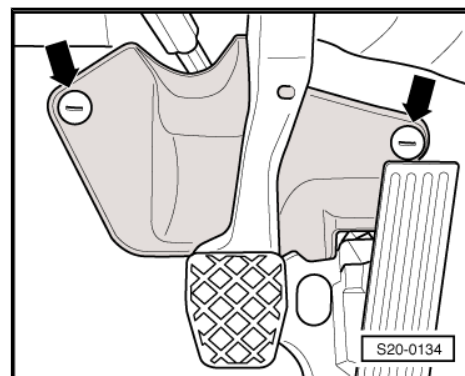
2.2 Removing and installing accelerator pedal module

Special tools and workshop equipment required

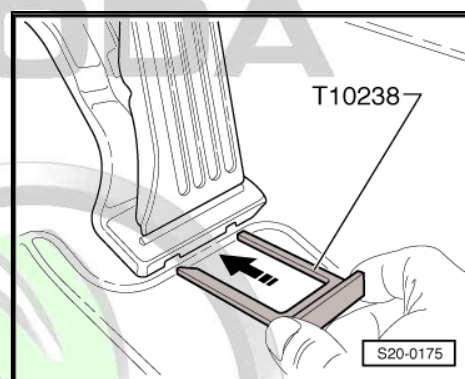
- ◆ Release tool -T10238- (for left-hand drive vehicle)
- ◆ Release tool -T10240- (for right-hand drive vehicle)

Removing

- Remove steering column cover -arrows-.
- Disconnect connector at accelerator pedal module
⇒ [page 164](#) .
- Lever out the cap ⇒ [Item 4 \(page 162\)](#) with a screwdriver.
- Unscrew the fixing screw ⇒ [Item 3 \(page 162\)](#) .

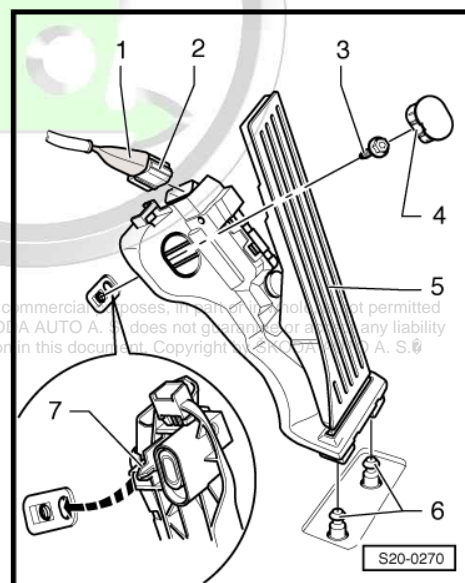


- Push the release tool -T10238- (for right-hand drive vehicles release tool -T10240 -) as shown up to the stop into the provided openings.
- Remove accelerator pedal module.



Install

- Fit the connector -2- onto the accelerator pedal module -5-
⇒ [page 164](#) .
- Push again rubber grommet -1- onto the connector -2-.
- Push accelerator pedal module onto the retaining bolts -6-.
- Insert the centering pin -7- into the hole in the underbody.
- Fasten accelerator pedal module with screw -3- (10 Nm) and fit on cap -4-.
- Re-install steering column cover.



Note

If the accelerator pedal module was replaced on vehicles with automatic gearbox, the engine control unit must be adapted ⇒ Vehicle diagnostic, testing and information system VAS 5051.

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2.3 Disconnect connector for accelerator pedal module and fit on



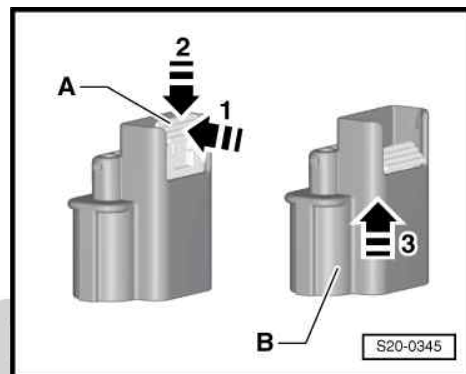
Note

The plugs for the accelerator pedal module which are inserted, must be disconnected and fit on in a different manner.

Disconnect connector 1K0 973 706

- Slightly press the piston slide valve -A- (grey) in -direction of arrow 1- and push it up to the stop in -direction of arrow 2-.
- Hold the piston slide valve in this position and disconnect the socket housing -B- in -direction of arrow 3-.

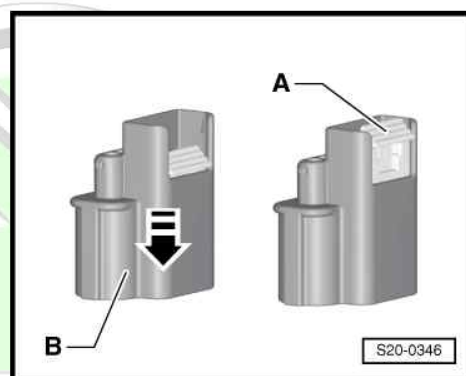
The piston slide valve -A- remains in the bottom position.



Fit on connector 1K0 973 706

- Push the socket housing -B- in -direction of arrow- until the piston slide valve can be heard to lock in place.
- For safety reasons, check the connector for secure catch by tightening it in the opposite direction.

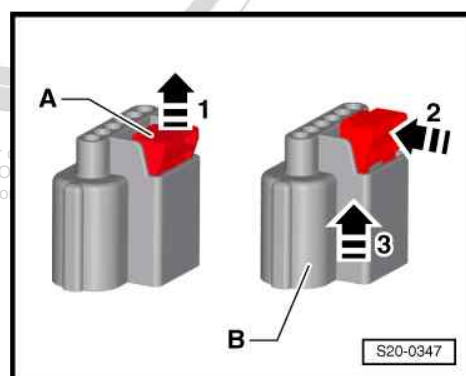
The piston slide valve -A- moves automatically upwards.



Disconnect connector 8K0 973 706

- Pull out the piston slide valve -A- (red) up to the stop in -direction of arrow-.
- Press the piston slide valve in -direction of arrow 2- and disconnect the socket housing -B- in -direction of arrow 3-.

The piston slide valve -A- remains in the top position.

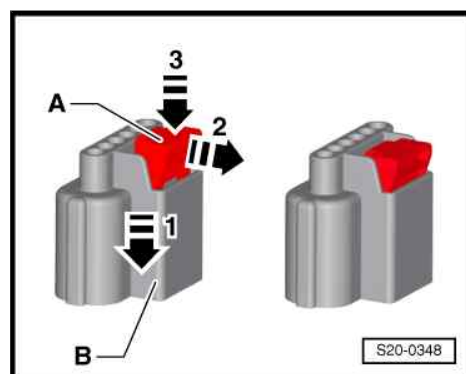


Fit on connector 8K0 973 706

- Push the socket housing -B- up to the stop in -direction of arrow 1-.
- Slightly press the piston slide valve in -direction of arrow 2- and push it in -direction of arrow 3-.

The piston slide valve -A- can only be pushed down if the socket housing was pushed up to the stop.

- For safety reasons, check the connector for secure catch by tightening it in the opposite direction.



21 – Turbocharging/supercharging

1 Charge-air system - exhaust gas turbocharger

Note

- ◆ Observe rules for cleanliness ➔ [page 5](#).
- ◆ Observe general instructions for charge-air system ➔ [page 5](#).

1.1 Exhaust gas turbocharger with component parts - Summary of components

The exhaust turbocharger and the exhaust manifold are one component part.

1 - Connecting pipe

- ☐ to radiator for exhaust gas recirculation

2 - Gasket

- ☐ replace

3 - 20 Nm

4 - 10 Nm

- ☐ at bracket
➔ [Item 33 \(page 167\)](#)

5 - 15 Nm

6 - Heat shield

7 - Exhaust gas turbocharger

- ☐ only complete with exhaust manifold
- ☐ removing and installing
➔ [page 167](#)
- ☐ Remove and install the connection pipe for the suction hose
➔ [page 214](#)

8 - Retaining loop

- ☐ can only be installed in one position

9 - O-ring

- ☐ replace

10 - Pulsation dampener

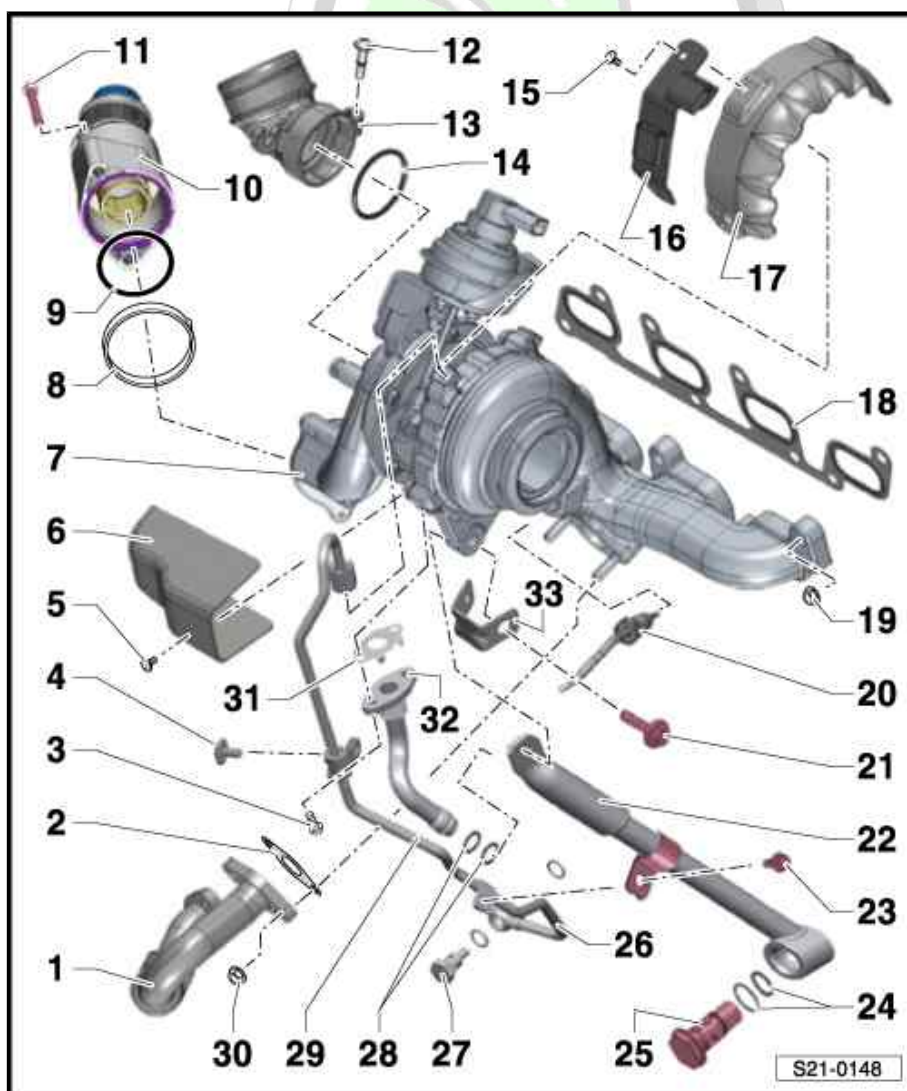
11 - 9 Nm

12 - 9 Nm

- ☐ captive in the inlet connection
➔ [Item 13 \(page 165\)](#)

13 - Inlet connection

- ☐ with fixing screw ➔ [Item 12 \(page 165\)](#)



**14 - O-ring**

- ☐ replace

15 - 15 Nm**16 - Support**

- ☐ for electrical cables

17 - Heat shield**18 - Gasket**

- ☐ replace

19 - 25 Nm

- ☐ replace

20 - Exhaust gas temperature sender 1 -G235- (Temperature sender upstream turbocharger -G507-), 45 Nm

- ☐ the thread of a new sender must be coated with assembly paste
- ☐ coat thread with hot bolt paste -G 052 112 A3- before installing a used sender
- ☐ removing and installing ➔ [page 171](#)

21 - 20 Nm**22 - Support for exhaust gas turbocharger**

- ☐ for oil return-flow line

23 - 10 Nm**24 - Gasket rings**

- ☐ different diameters, observe fitting position
- ☐ replace

25 - Hollow screw, 60 Nm**26 - Gasket rings**

- ☐ replace

27 - Hollow screw, 30 Nm**28 - O-ring**

- ☐ replace

29 - Oil feed line

- ☐ Tighten the union nut using the socket wrench insert -T40055- , tightening torque 22 Nm
- ☐ check continuity
- ☐ before installing, fill the exhaust gas turbocharger on the connection fitting with engine oil

30 - 24 Nm**31 - Gasket**

- ☐ replace

32 - Oil return pipe

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**Caution**

Before installing, check whether the bellows of the oil return pipe is not bent or overstretched. If this is the case, micro-cracks might occur which can result in leaks. Replace damaged oil return pipe or support for exhaust gas turbocharger.

33 - Support

- ☐ for oil feed line

1.2 Removing and installing exhaust gas turbocharger

Special tools and workshop equipment required

- ◆ Socket insert XZN 10 -T10385-
- ◆ Pliers for spring strap clamps

Removing



Caution

In case of mechanical damage to the exhaust gas turbocharger, e.g. damage of the compressor wheel, it is not sufficient to only replace the exhaust gas turbocharger. In order to prevent consequential damage to the engine, perform the following tasks:

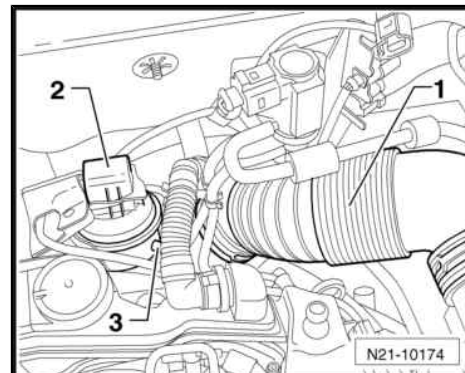
- ◆ *Clean all oil lines.*
- ◆ *Change engine oil and oil filter.*
- ◆ *Check air filter, air filter insert and charge air hoses as well as charge air pipes for soiling.*
- ◆ *Check all the air guides and the charge air cooler for foreign bodies.*

If foreign bodies are detected in the charge air system, the complete charge-air routing must be cleaned and if necessary the charge air cooler must also be replaced.



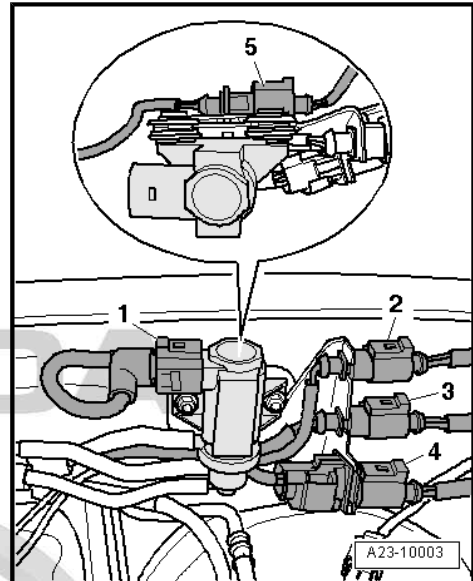
Note

- ◆ *Observe rules for cleanliness ➔ [page 5](#).*
- ◆ *Observe general instructions for charge-air system ➔ [page 5](#).*
- Remove pre-exhaust pipe:
- ◆ Engine identification characters CFHC, CFHF ➔ [page 225](#)
- ◆ Engine identification characters CLCA, CLCB ➔ [page 228](#)
- Remove air filter with air mass meter -G70- and inlet hose ➔ [page 214](#).
- Disconnect plug -2- from position sender for charge pressure regulator -G581- at exhaust gas turbocharger.
- Detach vacuum line -3- at exhaust gas turbocharger.





- Disconnect plug connection -3- for exhaust gas temperature sender 1 -G235- (temperature sender upstream turbocharger -G507-) and expose electrical cable.

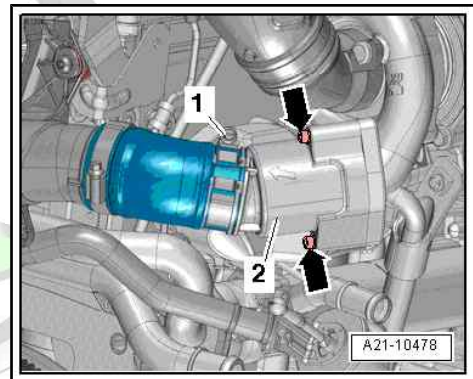


- Release screws -arrows-.
- Slacken hose clamp -1- and remove pulsation dampener -2-.



Caution

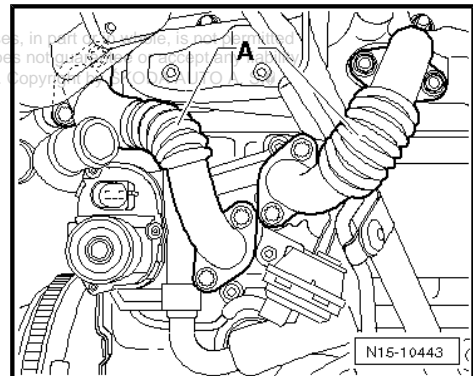
Pay attention that the bellows of the connection pipe is not bent and therefore is not overstretched. There is a risk of crack formation.



- Remove connection pipes for exhaust gas recirculation -A- with the socket insert XZN 10 -T10385-.

Vehicles with front-wheel-drive

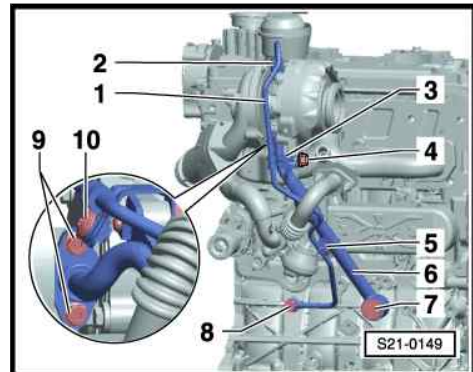
- Unscrew the union nut -2- of the oil feed line -1-.



- Screw out screws -4- and -9-.
- Release hollow screws -7- and -8-.
- Remove the support for exhaust gas turbocharger -6- with oil return pipe and oil feed pipe -1-.

Vehicles with four-wheel drive

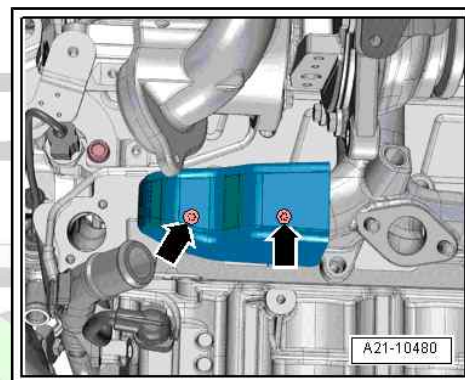
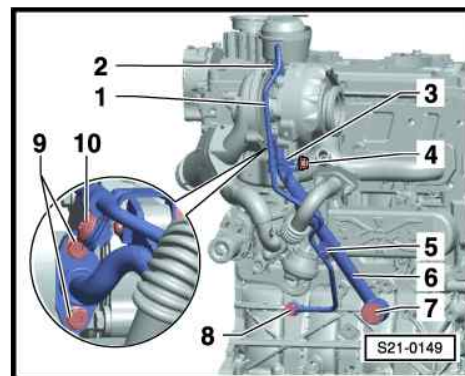
- Remove the right flange shaft from the angle gearbox ➔ Gearbox ➔ Rep. gr. 39 ➔ Chapter „Gasket ring in separated version for right flange shaft“ .



- Screw out screws -5- and -10-.
- Unscrew the union nut -2- and place the oil feed line -1- to the rear.
- Screw out screws -4- and -9-.
- Release hollow screw -7-.
- Remove support for exhaust gas turbocharger -6- with oil return pipe.

Continued for all vehicles

- Release screws -arrows- and remove heat shield.



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- Unscrew the fixing nuts of the exhaust manifold -arrows-.
- Remove exhaust turbocharger with exhaust manifold downwards.

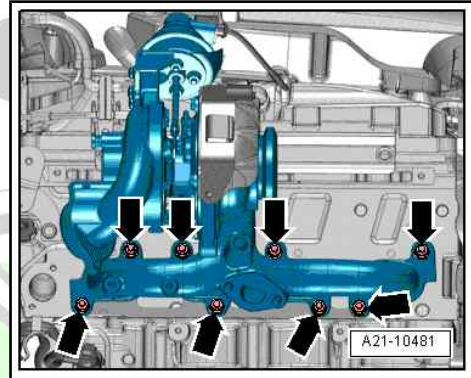
Install

Installation is performed in the reverse order, pay attention to the following points:



Caution

Before installing, check whether the bellows of the oil return pipe is not bent or overstretched. If this is the case, microcracks might occur which can result in leaks. Replace damaged oil return pipe or support for exhaust gas turbocharger.



Note

- ◆ Replace the gaskets, the sealing rings and the self-locking nuts.
- ◆ Fill exhaust turbocharger with engine oil through the connection fitting of the oil feed line.
- ◆ Remove oil and grease from the charge air pipes and hoses and from their connections before installing.
- ◆ Secure all hose connections with screw clamps.
- ◆ Only install approved clamps for securing the hose connections ⇒ Electronic Catalogue of Original Parts .
- ◆ Tightening torques: ⇒ [page 165](#)

- Checking the oil level ⇒ Maintenance ; Booklet Octavia II .



Note

After installing the exhaust turbocharger, run engine at idling speed for about 1 minute to ensure that oil is supplied to the turbocharger bearing.

1.3 Removing and installing exhaust gas temperature sender 1 -G235- (temperature sender upstream turbocharger - G507-)

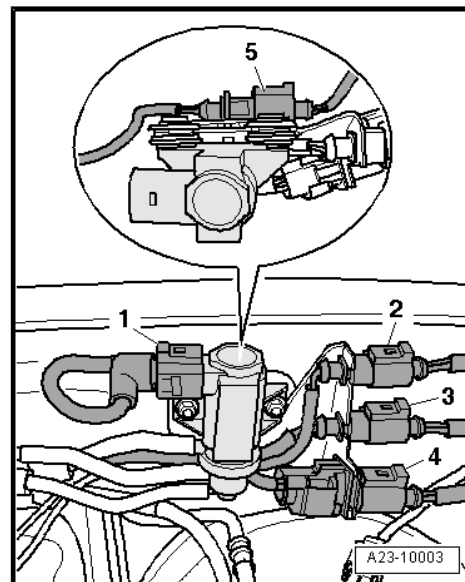
Removing

- Disconnect plug connection -3- for exhaust gas temperature sender 1 -G235- (temperature sender upstream turbocharger -G507-) and expose electrical cable.

Vehicles with four-wheel drive

- Remove propshaft ⇒ Gearbox ⇒ Rep. gr. 39 .

Continued for all vehicles



- Unscrew exhaust gas temperature sender 1 -G235- (temperature sender upstream turbocharger -G507-) -1- from the exhaust manifold.

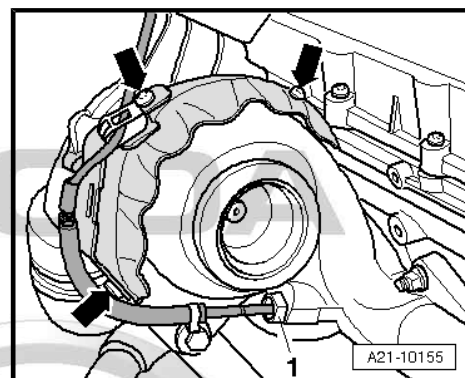
Install

Installation is performed in the reverse order, pay attention to the following points:



Note

- ◆ The thread of the new temperature sender must be coated with assembly paste.
- ◆ Before installing, grease only the thread with hot bolt paste - G 052 112 A3- for a re-used temperature sender.
- ◆ All cable straps should be fastened again in the same place when installing.
- ◆ Tightening torque: 45 Nm



1.4 Connection diagram for vacuum hoses



1 - Vacuum setting element

- ☐ for change-over flap for exhaust gas recirculation

2 - Non-return valve

- ☐ Check fitting position

3 - Changeover valve for radiator of exhaust gas recirculation -N345-

- ☐ Check change-over
⇒ [page 236](#)

4 - Cylinder head cover

- ☐ with integrated vacuum reservoir

5 - Vacuum setting element

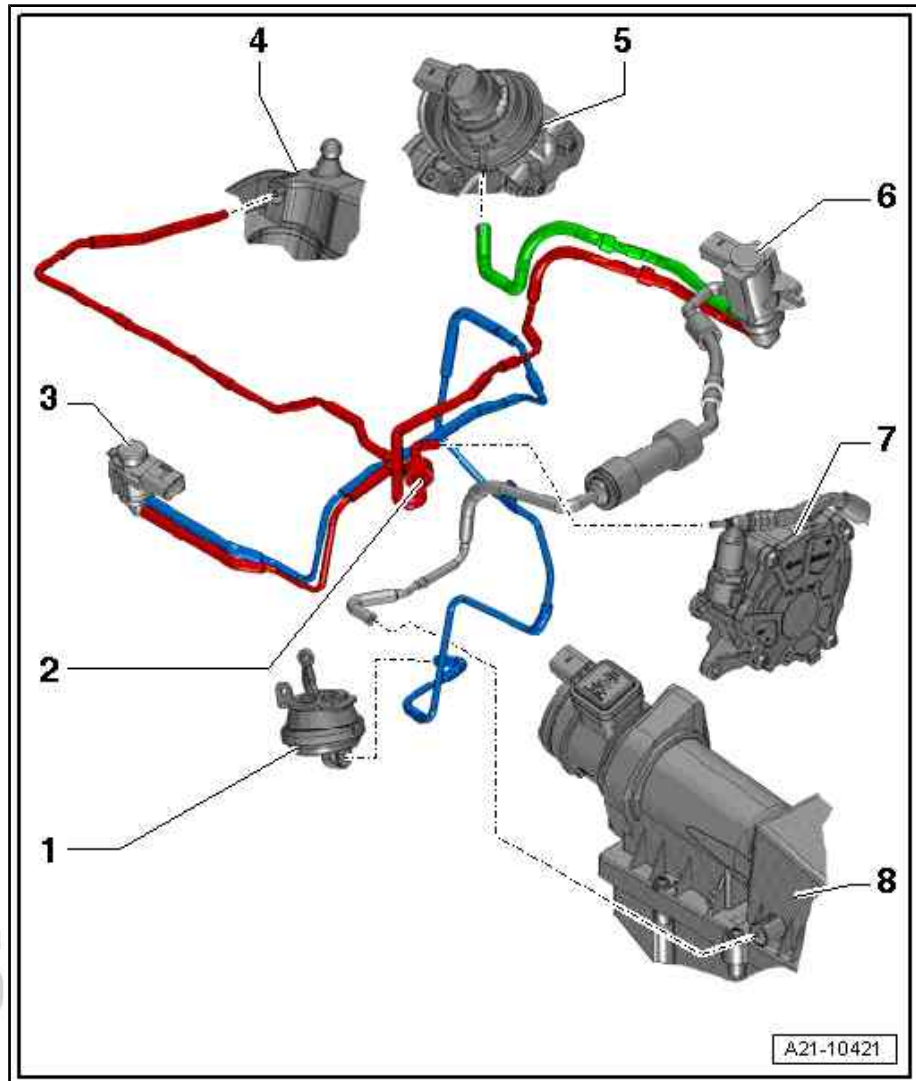
- ☐ at exhaust gas turbo-charger
- ☐ with position sender for charge pressure regulator -G581-

6 - Solenoid valve for charge pressure control -N75-

7 - Vacuum pump

8 - Air filter

- ☐ with connecting piece for vent line



1.5 Inspect the vacuum system



Caution

When routing the vacuum lines, make sure that the lines are not kinked, twisted or crimped. Otherwise this can lead to breakdown.

Special tools and workshop equipment required

- ◆ Hand vacuum pump , e.g. -VAS 6213-
- Remove engine cover ⇒ [page 7](#) .

Check vacuum supply line, vacuum reservoir and non-return valve

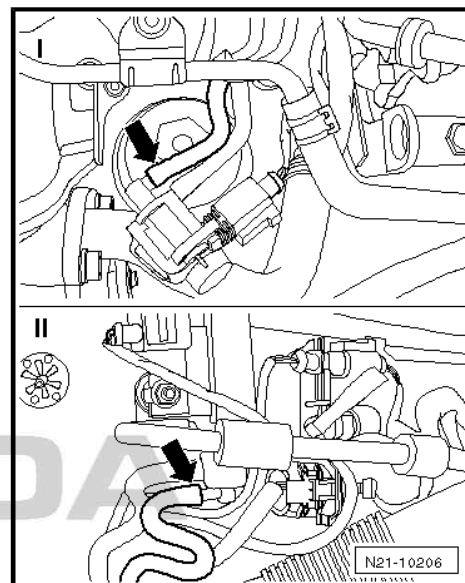
- Unclip the changeover valve for radiator of exhaust gas recirculation -N345- from the front bracket at the intake manifold.

- Detach the vacuum hose on the bottom connection of the exhaust gas recirculation radiator change-over valve -N345- -arrow in I-.
- Detach the vacuum hose on the bottom connection of the charge pressure control solenoid valve -N75- -arrow in II-.
- Close off the open hose ends with suitable plugs.

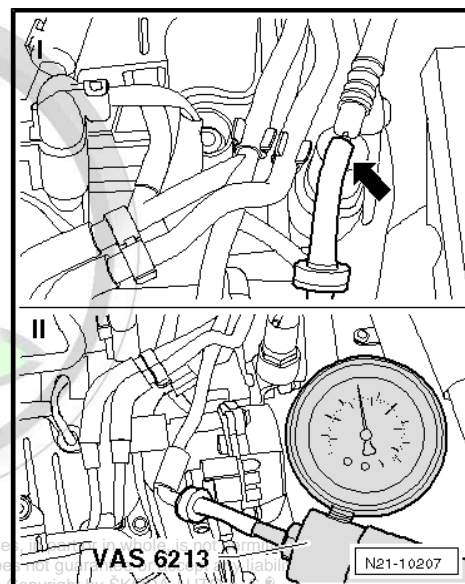


Note

Do not use any thread screws or thread bolts.



- Detach the vacuum hose -arrow in I- on the connecting piece of the vacuum pump.



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Note

In order to generate „vacuum“, push the ring -1- for the hand vacuum pump -VAS 6213- into position -A-.

- Attach the hand vacuum pump -VAS 6213- to the detached hose and generate a vacuum of 0.06 MPa (0.6 bar).
- Observe the pressure gauge of the hand vacuum pump for approx. 30 seconds.
- The vacuum must not drop.

If the vacuum drops:

- Search for damage, for example a leaky connection in the hose line, and replace the corresponding part.

If the vacuum does not drop:

- First of all, detach the hose at the hand vacuum pump -VAS 6213- .
- Remove one of the plugs from the hose ends.

If the non-return valve is functional, a significant spluttering can now be heard when the pressure is compensated for in the vacuum reservoir.

If no spluttering can be heard:

- Replace non-return valve.
- Re-connect all vacuum hoses.

Check the control vacuum line to the exhaust turbocharger

- Detach the hose -arrow in I- from the middle connection of the charge pressure control solenoid valve -N75- .
- Detach the hose from the vacuum setting element of the exhaust turbocharger -arrow in II-.
- Close one opening of the hose with a suitable plug.



Note

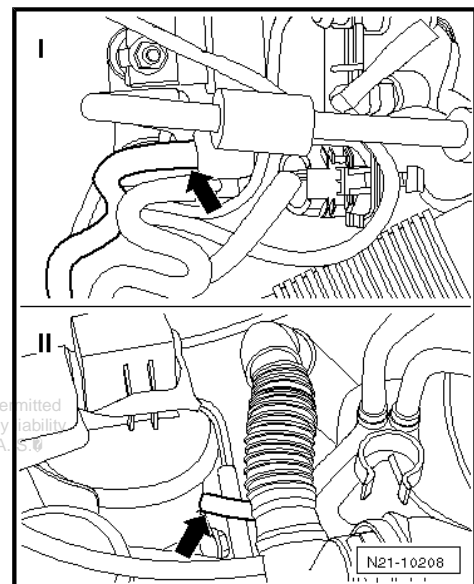
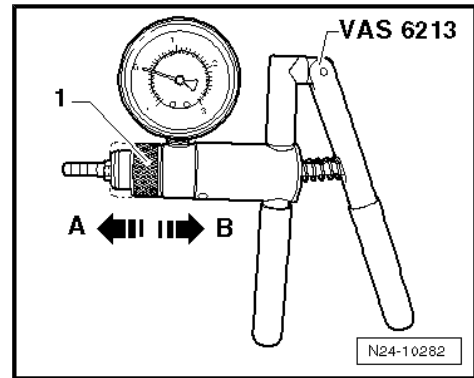
Do not use any thread screws or thread bolts.

- Attach the hand vacuum pump -VAS 6213- to the other end of the hose and generate a vacuum of 0.06 MPa (0.6 bar).
- Observe the pressure gauge of the hand vacuum pump for approx. 30 seconds.
- The vacuum must not drop.

If the vacuum drops:

- Replace vacuum hose.

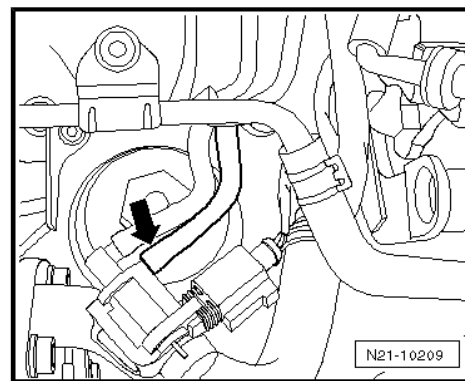
Check the control vacuum line to the vacuum setting element for the change-over flap for radiator of exhaust gas recirculation



- Detach the hose on the middle connection of the exhaust gas recirculation radiator change-over valve -N345- -arrow-.
- Attach the hand vacuum pump -VAS 6213- to the detached hose and generate a vacuum of 0.06 MPa (0.6 bar).
- Observe the pressure gauge of the hand vacuum pump for approx. 30 seconds.
- The vacuum must not drop.

If the pressure drops:

- Detach the vacuum hose on the vacuum setting element for the change-over flap for radiator of exhaust gas recirculation.
- Attach the hand vacuum pump -VAS 6213- with the factory-delivered test hose to the vacuum setting element and generate a vacuum of 0.06 MPa (0.6 bar).



Note

- ◆ *The adjustment on the vacuum setting element must be noticeable and the vacuum must not drop. If this is not the case, replace the radiator for exhaust gas recirculation*
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= page 236
- ◆ *If no defect can be found on the vacuum setting element, replace the vacuum line of the changeover valve for radiator of exhaust gas recirculation -N345-.*



2 Charge-air system - radiator, leak-tightness

2.1 Charge air cooling - Summary of components



Note

- ◆ Observe general instructions for charge-air system
⇒ [page 5](#).
- ◆ Observe tightening torques of screw clamps for hose connections ⇒ [page 177](#).

1 - Charge air cooler

- removing and installing
⇒ [page 177](#)

2 - Right charge air hose

3 - Screw clamp

- Tightening torque
⇒ [page 177](#)

4 - to throttle valve control unit -J338-

5 - Connecting hose

6 - 5 Nm

7 - Charge pressure sender - G31- with intake air temperature sender -G42-

8 - Rubber grommet

- replace if damaged

9 - 10 Nm

10 - Right charge air pipe

11 - Connecting hose

12 - from exhaust turbocharger

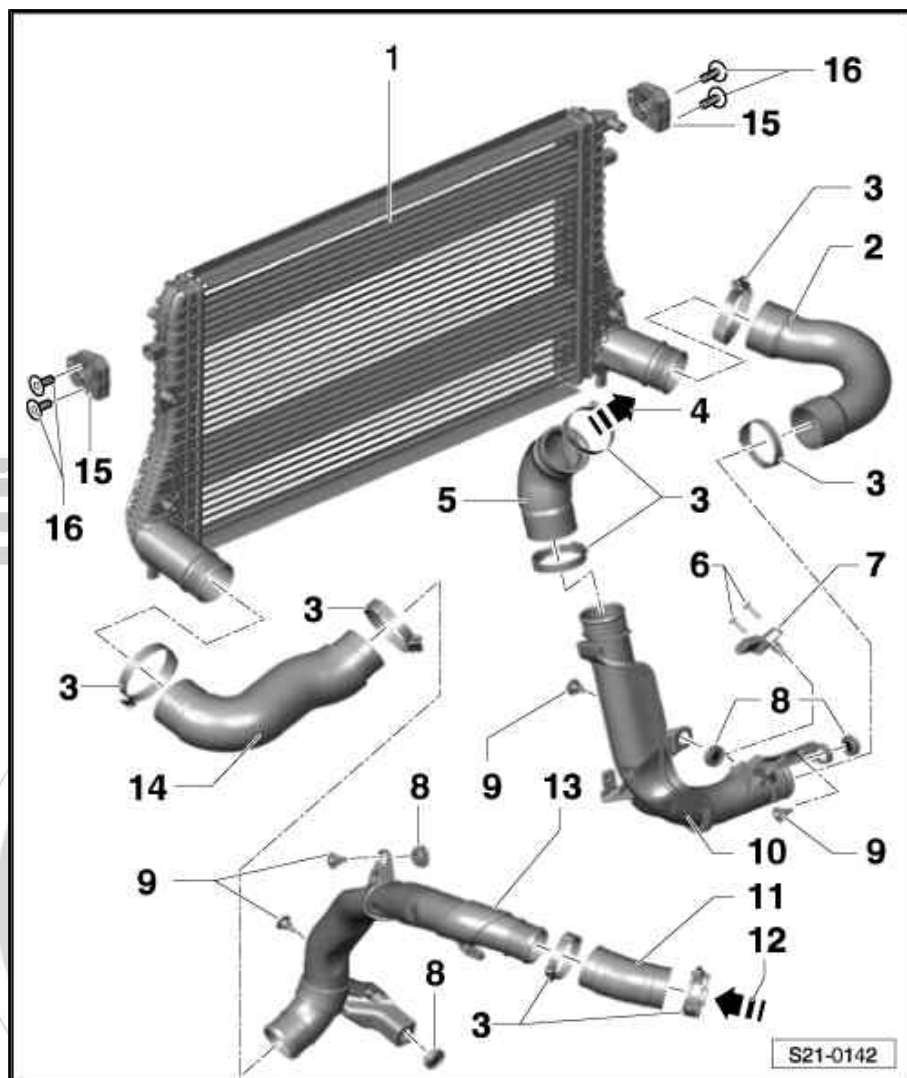
13 - Left charge air pipe

14 - Left charge air hose

15 - Support

- Check fitting position

16 - 5 Nm

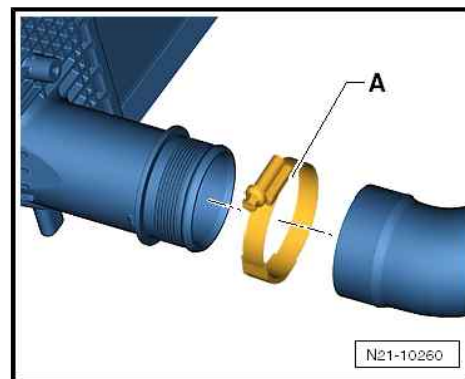


2.2 Hose connections with screw clamps



Note

- ◆ Connections, charge air pipes and hoses of charge air system must be free of oil and grease before being installed.
- ◆ Only install approved screw clamps for securing the hose connections ⇒ *Electronic Catalogue of Original Parts*.
- ◆ In order to secure the charge air hoses on their connection fittings, the threads must be treated with rust solvent if the screw clamps have been used beforehand.
- ◆ After a repair, check all the charge air pipes, charge air hoses and vacuum lines for tight connection and leaktightness.



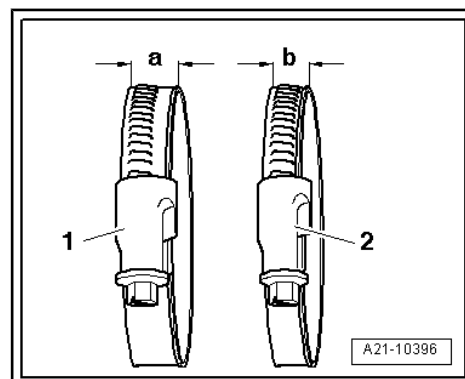
Caution

The screw clamps -A- on the charge air hoses must definitely be precisely tightened in accordance with the specifications ⇒ [page 177](#).

- ◆ **A too low or on the contrary, a too high tightening torque of the screw clamps, may result in the charge air hose slipping off the fluted pipe or the charge air pipe while driving.**

Tightening torques of screw clamps

- 1 - Screw clamp -a- = 12 mm: 5.5 Nm
- 2 - Screw clamp -b- = 9 mm: 3 Nm



2.3 Removing and installing charge air cooler

Removing

- Remove radiator ⇒ [page 129](#).
- Remove front bumper ⇒ Body Work ⇒ Rep. gr. 63.
- Remove the charge air hoses on the left and right from the charge air cooler.

Vehicles with air conditioning



WARNING

Do not open the refrigerant circuit of the air conditioning system.



Caution

In order to avoid damage to the condenser as well as to the refrigerant lines and hoses, ensure that the lines and hoses are not over-tensioned, kinked or bent.

- Release the securing bolts -arrows- of the condenser.

Continued for all vehicles

- Unscrew fixing screws for charge air cooler
⇒ [Item 16 \(page 176\)](#) on right and left side.

Vehicles with air conditioning

- Press off the charge air cooler from the lock carrier with the assistance of a 2nd mechanic so that the screw -1- for attaching the pipes of the air conditioning system is accessible.
- Unscrew bolt -1-.

Continued for all vehicles

- Carefully remove radiator downwards.

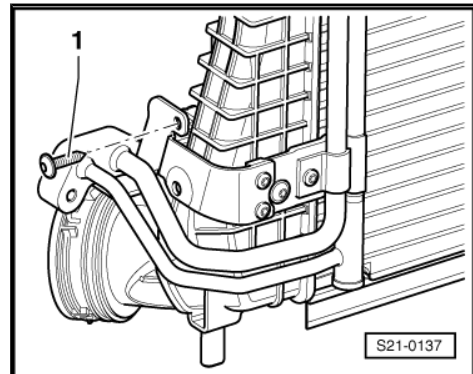
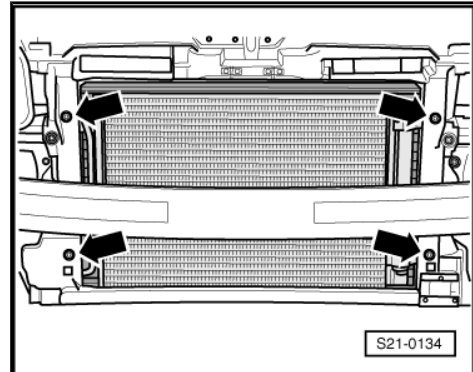
Install

Installation is performed in the reverse order, pay attention to the following points:



Note

- ◆ Replace O-rings.
- ◆ *Observe the mounting sequence for hose connections with screw clamps* ⇒ [page 177](#).



2.4 Checking the charge-air system for leaktightness

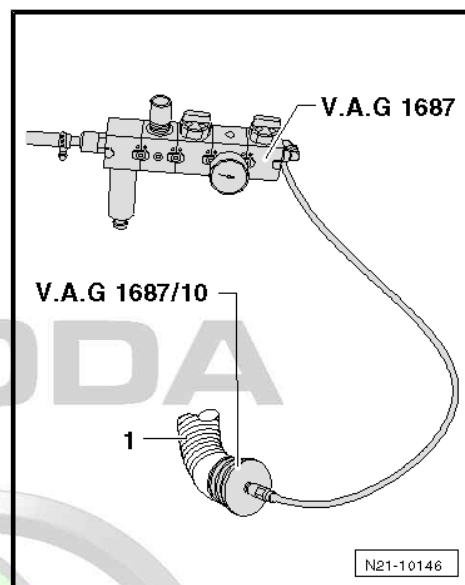
Special tools and workshop equipment required

- ◆ Charge-air system testing device , e. g. -V.A.G 1687-
- ◆ Adapter , e.g. -V.A.G 1687/10-

Test sequence

- Remove the intake hose -1- from the air filter.
- Fit adapter -1687/10- into the intake hose -1- and secure with a hose clamp.

Prepare tester for charge air system -V.A.G 1687- as follows:

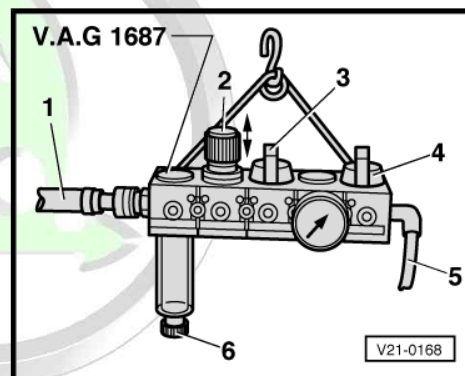


- Unscrew pressure control valve -2- fully and close the valves -3- and -4-.



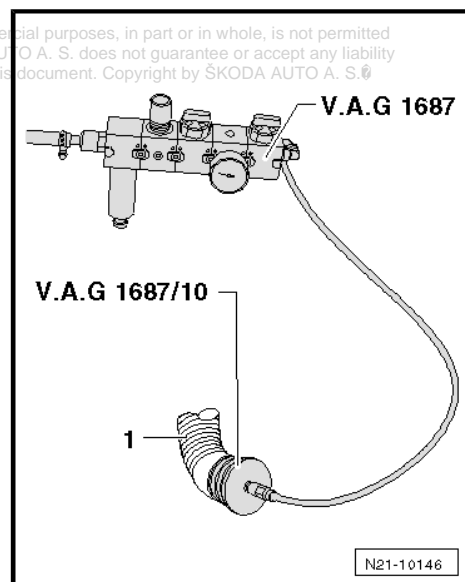
Note

The rotary knob must be pulled to the top in order to rotate the pressure control valve -2-.



- Connect tester for charge air system -V.A.G 1687- as shown to adapter -1687/10 - .

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- Connect the feed hose for the compressed air -1- to the tester.



Note

If there is water in the inspection glass, drain water via the drain plug -6-.

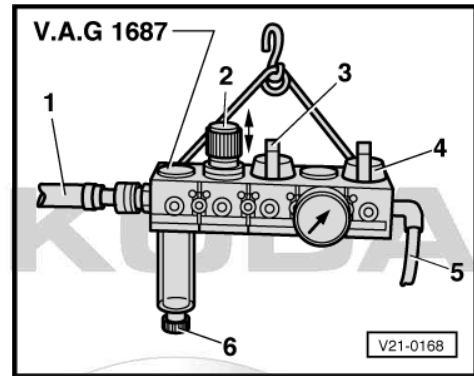
- Open valve -3-.
- Set the pressure to 0.05 MPa (0.5 bar) with the pressure control valve -2-.



Caution

The pressure must not be greater than 0.05 MPa (0.5 bar)! A too high pressure can damage the engine.

- Open valve -4- and wait until the test circuit is filled. If necessary regulate the pressure to 0.05 MPa (0.5 bar).
 - Charge-air system:
 - ◆ by looking,
 - ◆ by listening,
 - ◆ by touching,
 - ◆ with a commercially available leak search spray, or
 - ◆ with ultrasonic measuring device , e.g. -V.A.G 1842- ,
- check for leak points.



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Note

- ◆ *Minor leaks are permissible on the suction side of the turbo-charger, because the intake hoses are not designed for over-pressure.*
- ◆ *A small amount of air penetrates via the inlet valves into the engine. For this reason no pressure test is possible.*
- ◆ *Use of ultrasonic measuring device -V.A.G 1842- ⇒ operating instructions .*
- ◆ *In case of a leak point, observe the instructions for charge air system ⇒ [page 5](#) during the installation.*
- ◆ *Before removing the adapter -1687/10- by loosening the hose clamp, release the pressure in the test circuit.*

23 – Mixture preparation - injection

1 Diesel direct injection system - fitting locations, system overview

The control unit is equipped with a fault memory. Before repairs, setting operations and fault finding, interrogate the fault memory and execute a self-diagnosis ⇒ Vehicle diagnostic, testing and information system VAS 5051.



Note

- ♦ *Faults can be detected by the control unit as checking and adjustment work is being undertaken and then saved. It is therefore absolutely necessary to read and delete the fault memory after completing all checking and adjustment work ⇒ Vehicle diagnostic, testing and information system VAS 5051.*
- ♦ *Observe the safety precautions when working on the diesel direct injection system ⇒ [page 3](#).*

1.1 Overview of fitting locations

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1 - Differential pressure sender -G505-

- ☐ only installed on engine with identification characters CFHC, CFHF

2 - Hall sender -G40- (camshaft position sensor)

3 - lambda probe -G39- with heating for lambda probe -Z19-

- ☐ only on engine with identification characters CFHC, CFHF

4 - Engine control unit -J623-

5 - Injection units

- ☐ Injection valve for cylinder 1 -N30-
- ☐ Injection valve for cylinder 2 -N31-
- ☐ Injection valve for cylinder 3 -N32-
- ☐ Injection valve for cylinder 4 -N33-

6 - Exhaust gas return valve -N18-

- ☐ consists of:
 - ◆ mechanical valve (electrically operated)
 - ◆ EGR control motor -V338-
 - ◆ EGR potentiometer -G212-

7 - Position sender for charge pressure regulator -G581-

8 - Control valve for fuel pressure -N276-

9 - Solenoid valve for charge pressure control -N75-

10 - Connector

- ☐ for exhaust gas temperature sender 4 -G648- (only on engine with identification characters CFHC, CFHF)
- ☐ for exhaust gas temperature sender 1 -G235- (Temperature sender upstream turbocharger -G507-)
- ☐ for lambda probe -G39- (only on engine with identification characters CFHC, CFHF)

11 - Air mass meter -G70-

12 - Coolant temperature sender -G62-

13 - Engine speed sender -G28-

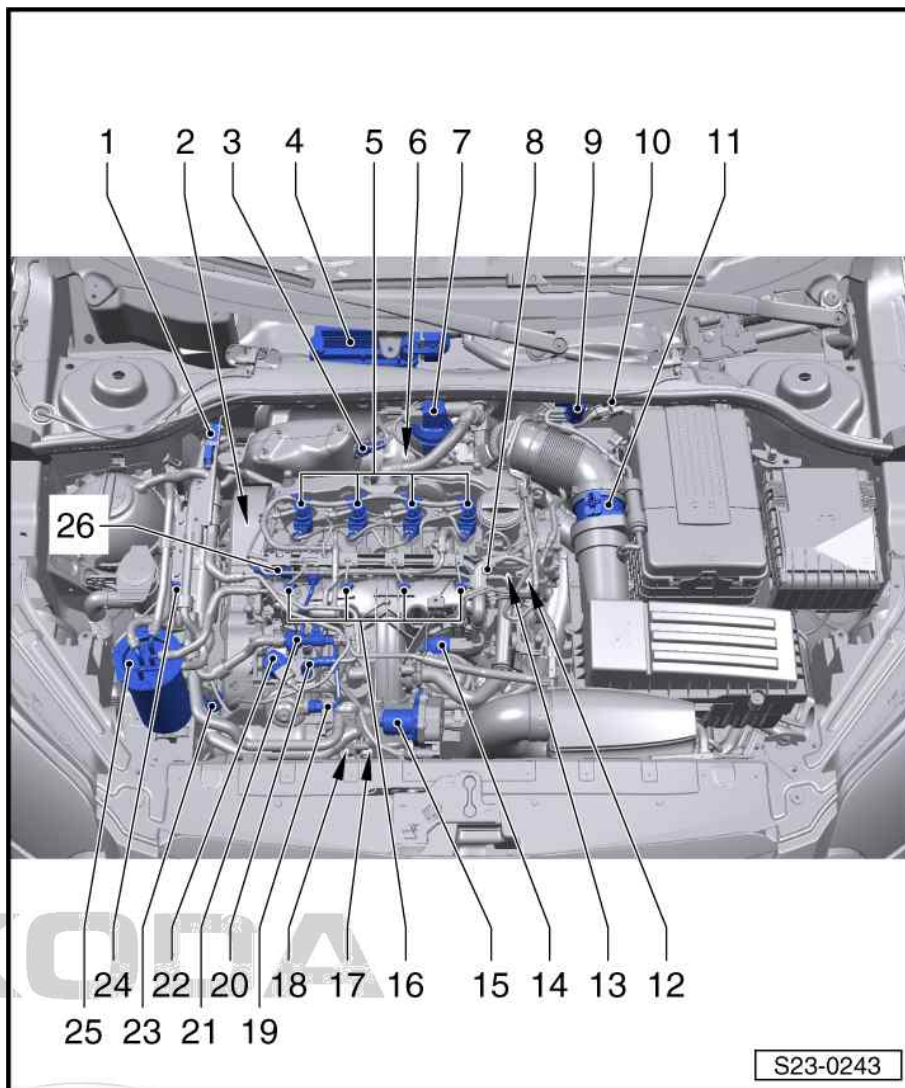
- ☐ removing and installing ➔ [page 184](#)

14 - Changeover valve for radiator of exhaust gas recirculation -N345-

15 - Throttle valve control unit -J338-

16 - Glow plugs

- ☐ Glow plug 1 -Q10-
- ☐ Glow plug 2 -Q11-
- ☐ Glow plug 3 -Q12-
- ☐ Glow plug 4 -Q13-



- 17 - Coolant recirculation pump 2 -V178-
- 18 - Charge pressure sender -G31-
- 19 - Connection of high pressure line
 - ☐ to fuel high pressure reservoir
- 20 - Connection of high pressure line
 - ☐ from fuel filter
- 21 - Fuel temperature sender -G81-
- 22 - High pressure pump with fuel dosage valve -N290-
- 23 - Coolant temperature sender at radiator outlet -G83-
- 24 - Additional fuel pump -V393-
- 25 - Fuel pressure sender -G247-
- 26 - Fuel filter

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1.2 System overview



WARNING

Absolutely observe the safety precautions when working on the diesel direct injection system ⇒ page 3.

1 - Fuel dosage valve -N290-

- do not open

2 - High pressure pump

- ❑ removing and installing
⇒ page 187

3 - Fuel pressure sender - G247-

- removing and installing
⇒ **page 202**

4 - Fuel high pressure reservoir

5 - Control valve for fuel pressure -N276-

- ❑ removing and installing
⇒ page 205
- ❑ check ⇒ page 205

6 - Injection unit

- removing and installing
⇒ page 196

7 - Fuel return-flow line

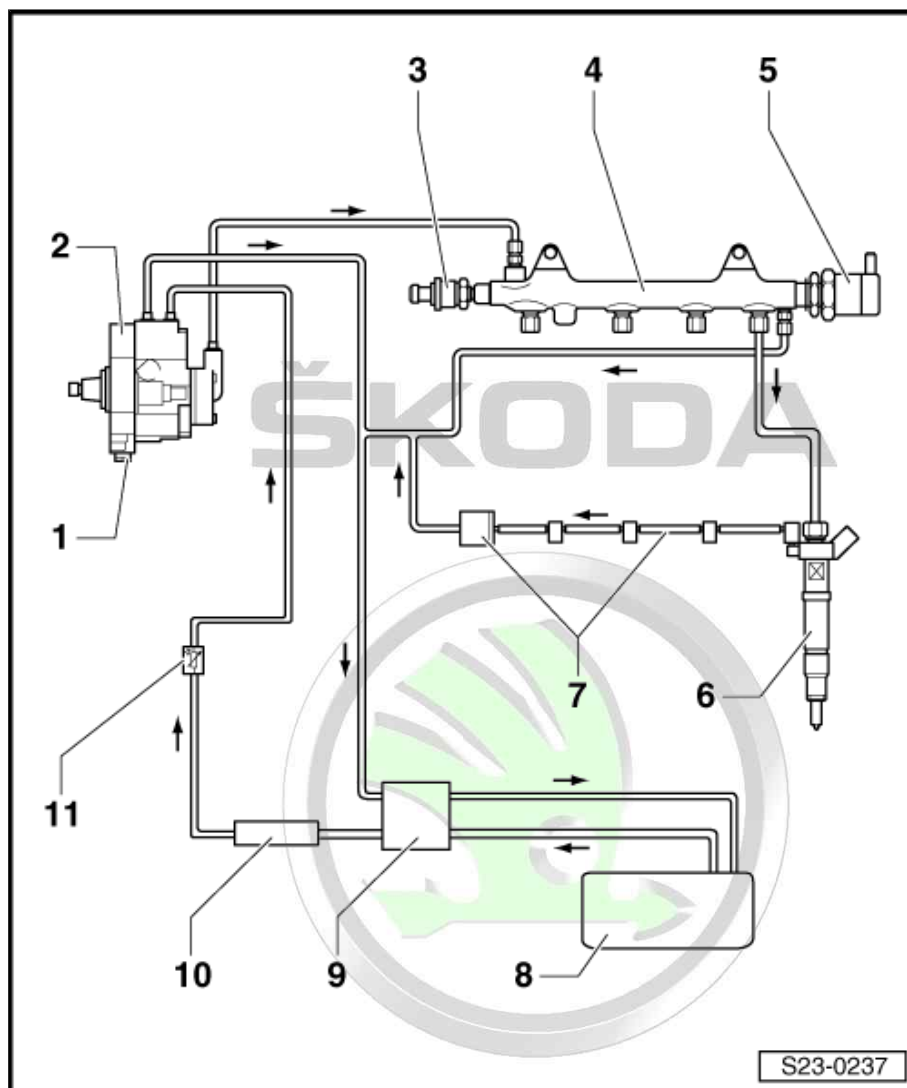
- ❑ from the injection units
- ❑ with pressure holding valve approx. 0.2 MPa (2.0 bar)

8 - Fuel tank

9 - Fuel filter

10 - Additional fuel pump - V393-

11 - Fuel temperature sender - G81-



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1.3 Removing and installing engine speed sender -G28-

Special tools and workshop equipment required

- ◆ Socket insert -T10370-
- ◆ Assembly device -T10118-

Removing

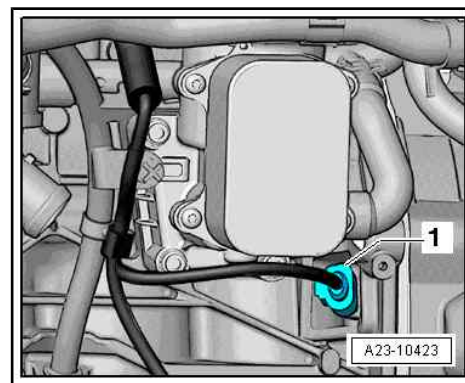
- Remove noise insulation ⇒ Body Work ⇒ Rep. gr. 50 .

- Disconnect the plug -1- on the engine speed sender -G28- with the assembly device -T10118- and lay the electrical cable to the side.



Note

To unlock the plug without using the assembly device -T10118-, the unlock button must be pressed at the plug using a screwdriver and at the same time unlock the unlock button with a thin wire hook.



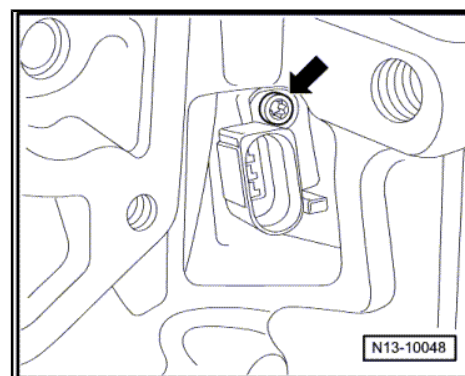
- Unscrew the fixing screw -arrow- of the engine speed sender -G28- and pull out the sender.

Install

Installation is performed in the reverse order, pay attention to the following points:

Tightening torque

Component	Nm
Engine speed sender -G28- on the flange	5



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2 Fuel system, engine side

2.1 High pressure pump - Summary of components

1 - Bracket for auxiliary units

2 - 20 Nm + torque a further 180° (1/2 turn)

- ☐ replace

3 - Hub

- ☐ with transmitter ring
- ☐ to release and tighten use counterholder - T10051-
- ☐ to remove use extractor -T40064-

4 - Toothed belt gear

- ☐ for high pressure pump

5 - 20 Nm + torque a further 90° (1/4 turn)

- ☐ replace

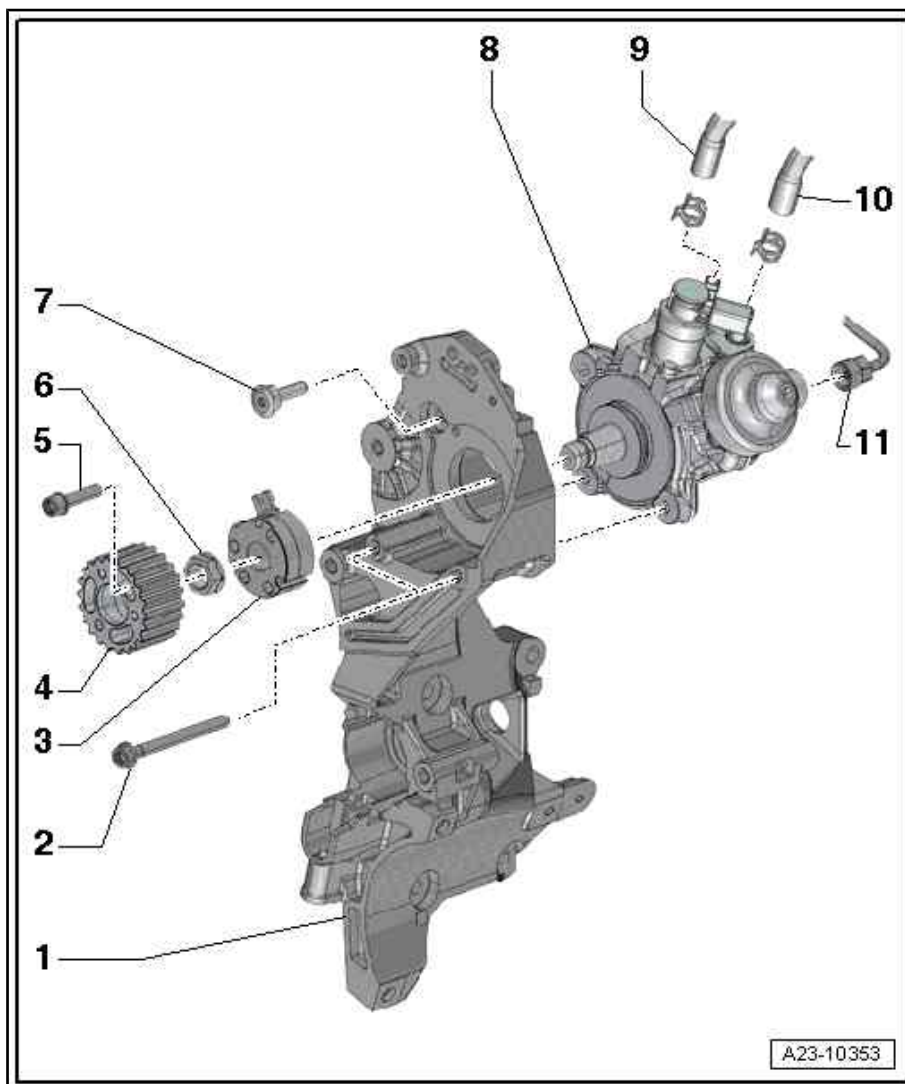
6 - 95 Nm

7 - 20 Nm + torque a further 45° (1/8 turn)

- ☐ replace

8 - High pressure pump

- ☐ removing and installing
⇒ [page 187](#)
- ☐ with fuel dosage valve - N290- (do not open)
- ☐ an initial fuel filling must be carried out after the replacement (absolutely avoid it to run dry)
⇒ [page 189](#)



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9 - Fuel intake hose

10 - Fuel return-flow hose

11 - Fuel high pressure pipe, 15 Nm + torque a further 60° (1/6 turn)

- ☐ between high pressure pump and fuel high pressure reservoir
- ☐ do not install under tension
- ☐ Tighten union nuts in one work step without time delay between tightening and torquing angle (max. 1 min)
- ☐ first of all tighten the union nut on the side of the high pressure pump
- ☐ only tighten the fixing screw after tightening both union nuts



Note

- ◆ The high pressure line can be re-used after the following tests:

- ◆ Check the sealing cones and the union nuts for damage, deformations and tears.
- ◆ The inner line boring must not be deformed, constricted or damaged.
- ◆ A corroded high pressure line must not be reinstalled.

2.2 Removing and installing the high pressure pump

Special tools and workshop equipment required

- ◆ Counterholder -T10051 -
- ◆ Extractor -T40064-
- ◆ Thrust piece -T40064/1-
- ◆ Cylinder head screws -T40064/2-

Removing

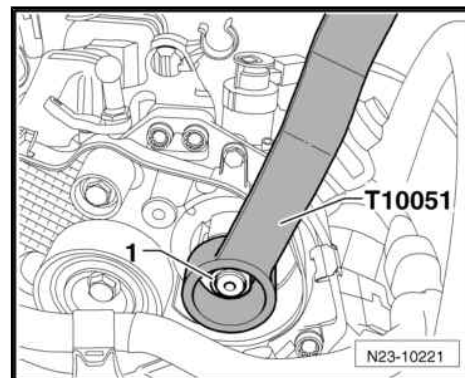
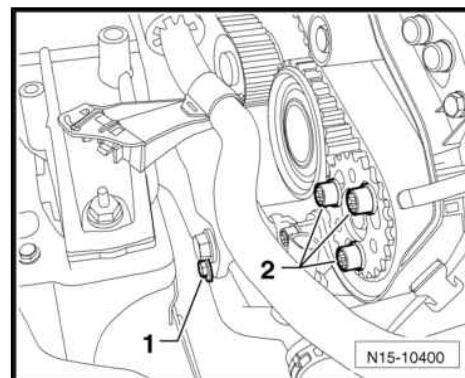


Note

- ◆ Safety precautions when working on the fuel supply system ➔ [page 3](#) .
- ◆ Observe rules for cleanliness ➔ [page 4](#) .
- Pull toothed belt off camshaft sprocket and from toothed belt gear on the high pressure pump ➔ [page 33](#) .
- Release screws -2- and remove timing belt gear from the high pressure pump.

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- Hold the hub of the high pressure pump with the counterholder -T10051- and unscrew the securing nut -1-.

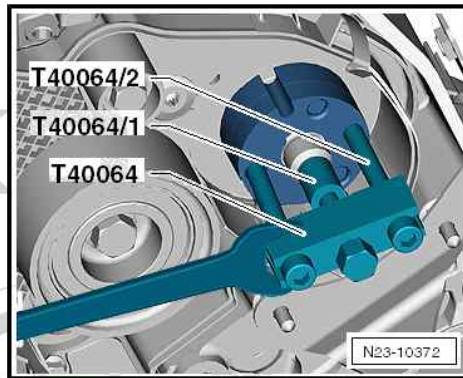




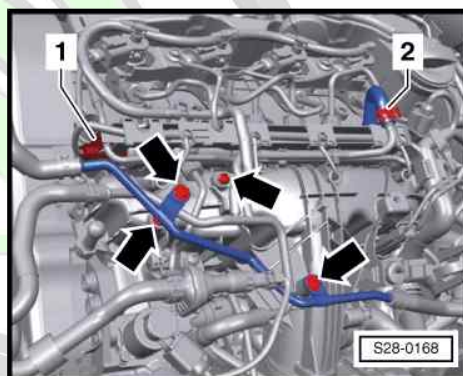
Note

Replace the basic pressure plate with the pressure plate - T40064/1- on the extractor - T40064- .

- Position extractor -T40064- with thrust piece -T40064/1 - and cylinder head screws (bolts) -T40064/2- as shown.
- Detach the hub from the high pressure pump, if necessary counterhold with a lateral wrench SW 24.

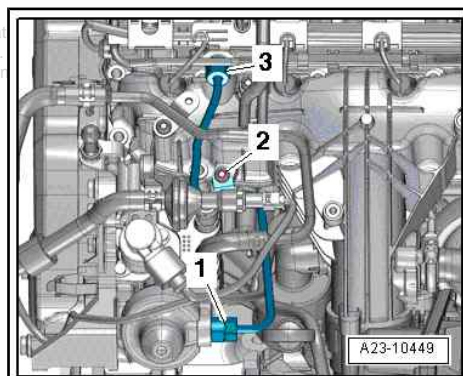


- Release screws -arrows-.
- Lay the coolant return-flow line and the fuel return-flow line to the side.

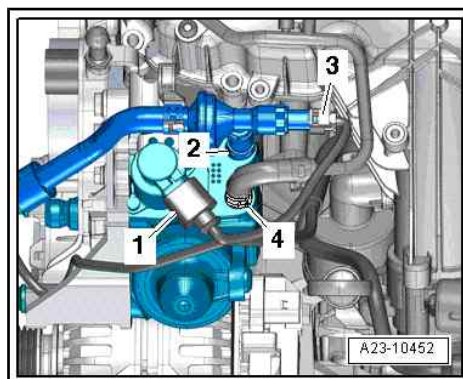


- Release screw -2- and union nuts -1- and -3- and remove high pressure line.

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- Disconnect plugs -1- and -3-.
- Remove fuel intake hose -2- and fuel return-flow hose -4-.



- Release the fixing screws -arrows- of the high pressure pump.
- Carefully remove the high pressure pump.

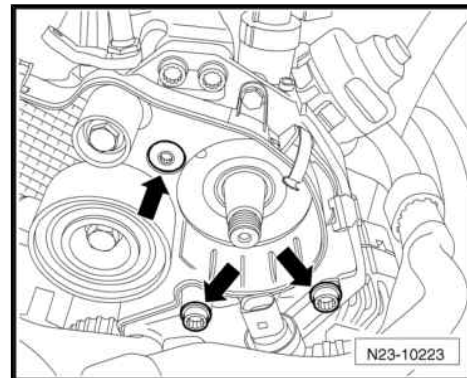
Install



Caution

Risk of damage to the high pressure pump through running dry.

- ◆ ***After reinstalling the high pressure pump: carry out the basic setting „check fuel pump“ »3 times« before the first engine start ⇒ Vehicle diagnostic, testing and information system VAS 5051.***
- ◆ ***After installing a new high pressure pump: fill up the high pressure pump with fuel before the first engine start ⇒ [page 189](#).***



Installation is performed in the reverse order, pay attention to the following points:



Note

- ◆ *When installing the high pressure pump, ensure that no dirt penetrates the fuel system.*
- ◆ *Only remove the screw plug immediately before installing the fuel lines.*
- ◆ *The fixing screws for the high pressure pump must be replaced.*

Tightening torques: ⇒ [page 186](#)

2.3 Filling and bleeding the high pressure pump/fuel system

Special tools and workshop equipment required

- ◆ Cleaning and degreasing agent, e.g. -D 000 401 04-
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- ◆ Vehicle Diagnosis, Measurement and Information System - VAS 505X-
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Caution

Risk of damage to the high pressure pump through running dry.

- ◆ ***After installing a new high pressure pump, the high pressure pump must be filled up with fuel before the first engine start. Avoid the high pressure pump to run dry.***



Note

- ◆ *When installing the high pressure pump, ensure that no dirt penetrates the fuel system.*
- ◆ *Only remove the screw plug immediately before installing the fuel lines.*
- On vehicles with automatic gearbox the selector lever must be in position „P“.



- The vehicle must be filled up.
- Temperature of the fuel system $\geq 15^{\circ}\text{C}$.

In order to fill up the high pressure pump with fuel, proceed as follows:

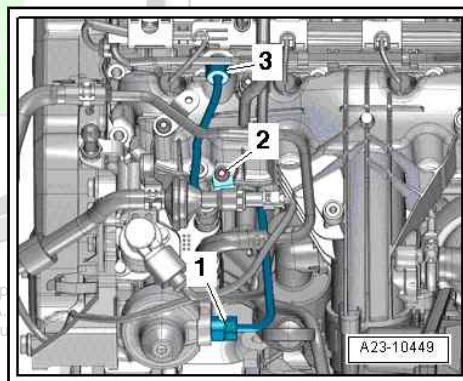
- Connect vehicle diagnosis, measurement and information system -VAS 505X- .
 - Switch on ignition.
 - Select the „Engine electronics“ in the self-diagnosis.
 - Then select „006 - Basic setting“.
 - Then select „Test of fuel pump for predelivery“.
 - Subsequently press on „Start“.
 - ♦ The fuel pumps start running for approx. 60 seconds.
 - Repeat this work procedure 3x.
- This ensures that the high pressure pump is adequately filled up with fuel.
- Degrease the union nuts -1- and -3- of the high pressure line and their surrounding area at the high pressure pump and at the fuel high pressure reservoir.
 - Start the engine and let it run at an average speed for a few minutes.
 - Carry out a visual inspection of the fuel system for leaks after switching off the engine.

If there is leakage despite the correct tightening torque:

- Replace the related component part and repeat the filling/bleeding procedure.
- Then carry out a test drive with minimum one full load acceleration up to max. speed.
- Then once again carry out a visual inspection of the fuel system for leaks.

If there is leakage despite the correct tightening torque:

- Replace the related component part and repeat the filling/bleeding procedure.
- Interrogate and if necessary erase fault memory of engine control unit \Rightarrow Vehicle diagnostic, testing and information system VAS 5051.
- Check readiness code, if necessary re-generate \Rightarrow Vehicle diagnostic, testing and information system VAS 5051.



2.4 Check the fuel system for tightness

Special tools and workshop equipment required

- ♦ Cleaning and degreasing agent , e.g. -D 000 401 04-
- ♦ Vehicle Diagnosis, Measurement and Information System - VAS 505X-
- Degrease all fuel connections.
- Let the engine run at idling speed for a few minutes.
- Carry out a visual inspection of the complete fuel system for leaks after switching off the engine.

If there is leakage despite the correct tightening torque:

- Replace the related component part and repeat the procedure.
- Then carry out a test drive with minimum one full load acceleration up to max. speed.
- Then once again carry out a visual inspection of the complete fuel system for leaks.

If there is leakage despite the correct tightening torque:

- Replace the related component part and repeat the procedure.
- Interrogate and if necessary erase fault memory of engine control unit ➔ Vehicle diagnostic, testing and information system VAS 5051.



Note

After deleting the fault memory of the engine control unit the readiness code must be checked, if necessary re-generated ➔ Vehicle diagnostic, testing and information system VAS 5051.

2.5 Injection units (solenoid injectors) - Summary of components

1 - Sealing ring

- ☐ in the cylinder head cover
- ☐ replace ➔ [page 68](#)

2 - Copper seal

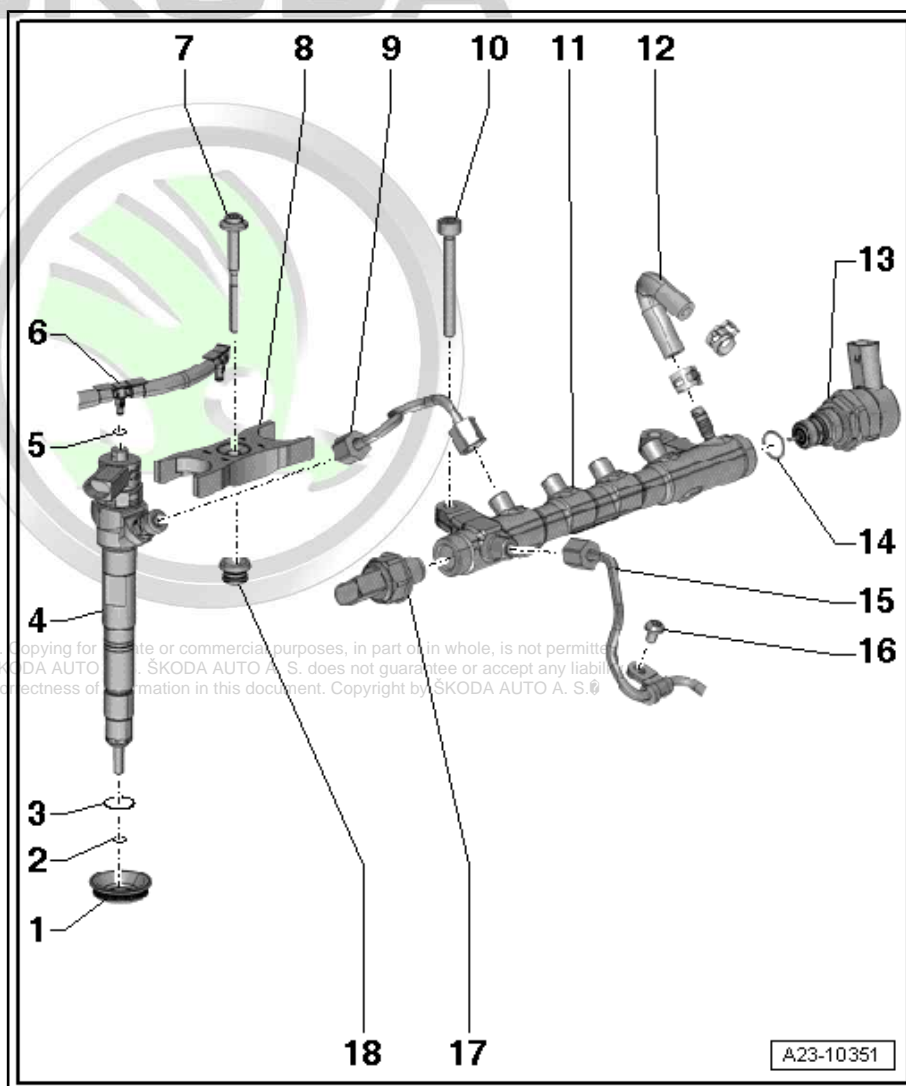
- ☐ replace

3 - O-ring

- ☐ replace

4 - Injection unit (solenoid injector)

- ☐ do not mix up - when removing, mark the fitting position of the pair of injection units (injectors) and the clamping claw
- ☐ When slackening the union nut of the high pressure lines, hold the connection fitting with an open-end wrench
- ☐ removing and installing ➔ [page 196](#)
- ☐ when installing, the following must be replaced each time: copper seals of injectors, O-rings for bores of injection valve heads, O-rings for connections of fuel return-flow line and the screw of the clamping claw
- ☐ when replacing, also replace the clamping claw and the relevant high pressure line
- ☐ when replacing, the adaptation according to the code „injector quantity adjustment IQA“ must also be carried out ➔ [page 194](#)



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Note

Observe the instructions when re-using the injection units (injectors)
⇒ [page 197](#) .

5 - O-ring

- ☐ replace

6 - Fuel return-flow line

- ☐ from the injection units
- ☐ with pressure holding valve approx. 0.2 MPa (2.0 bar)
- ☐ removing and installing ⇒ [page 196](#)
- ☐ must not be kinked, damaged or blocked
- ☐ do not disassemble
- ☐ after an exchange, the engine must run at idling speed for approx. 2 minutes in order to vent the fuel system; afterwards check the fuel return-flow line for tightness

7 - 8 Nm + torque a further 180° (1/2 turn)

- ☐ together with 2 injection units
- ☐ replace
- ☐ before tightening, first of all tighten the union nuts of the high pressure lines

8 - Clamping claw

- ☐ together with 2 injection units
- ☐ do not exchange - when removing, mark fitting position
- ☐ check fitting position ⇒ [page 193](#)
- ☐ replace, when installing new injection units (injectors)

9 - High pressure line, 15 Nm + torque a further 60° (1/6 turn)

- ☐ between fuel high pressure reservoir and injection unit
- ☐ do not exchange - when removing, mark
- ☐ when slackening the union nut at the injection unit, counterhold the connection fitting with a lateral wrench
- ☐ do not install under tension
- ☐ Tighten union nuts in one work step without time delay between tightening and torquing angle (max. 1 min)
- ☐ first of all tighten the union nut on the side of the injection unit (injector)



Note

- ◆ *Pay attention to the cylinder specific marking when re-using the high pressure lines.*
- ◆ *The high pressure lines can be re-used after the following tests:*
- ◆ *Check the sealing cones and the union nuts for damage, deformations and tears.*
- ◆ *The inner line boring must not be deformed, constricted or damaged.*
- ◆ *The corroded injection lines must not be re-used.*

10 - 22 Nm

11 - Fuel high pressure reservoir

- ☐ removing and installing ➔ [page 200](#)
- ☐ Tighten the fixing screws ➔ [Item 10 \(page 193\)](#) only after tightening the union nuts for the high pressure lines ➔ [Item 9 \(page 192\)](#) and the union nut of the high pressure line ➔ [Item 15 \(page 193\)](#)

12 - Fuel return-flow hose

13 - Fuel pressure regulating valve -N276- , 80 Nm

- ☐ cannot be re-used, replace after removal
- ☐ replace ➔ [page 205](#)

14 - O-ring

- ☐ replace

15 - High pressure line, 15 Nm + torque a further 60° (1/6 turn)

- ☐ between high pressure pump and fuel high pressure reservoir
- ☐ do not install under tension
- ☐ Tighten union nuts in one work step without time delay between tightening and torquing angle (max. 1 min)
- ☐ first of all tighten the union nut on the side of the high pressure pump, to do so counterhold the connection fitting
- ☐ Only tighten the fixing screw of the clamp ➔ [Item 16 \(page 193\)](#) after tightening both union nuts



Note

◆ *The high pressure lines can be re-used after the following tests:*

◆ *Check the sealing cones and the union nuts for damage, deformations and tears.*

◆ *The inner line boring must not be deformed, constricted or damaged.*

◆ *A corroded high pressure line must not be reinstalled.*

16 - 8 Nm

17 - Fuel pressure sender -G247- , 100 Nm

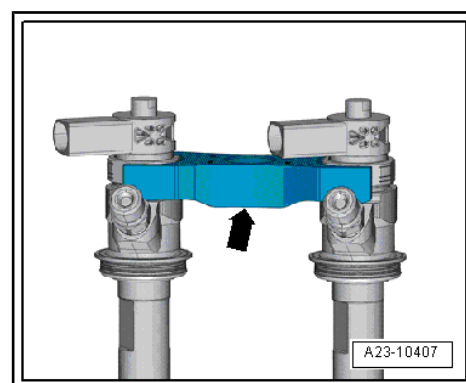
- ☐ removing and installing ➔ [page 202](#)

18 - Grommet

- ☐ in the cylinder head cover

Fitting position of the clamping claw

- The clamping claw with 2 injection units.
- The thickening -arrow- of the clamping claw points downwards.





2.7 Always search for injection units in open state

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- Clean all the connections of the high pressure lines on the fuel high pressure reservoir and on the injection units with grease remover and let all the cleaned parts dry off.



Note

Check the injection units of all the cylinders one after the other.

Start testing cylinder 1.

- Fit the plug of the injection unit to be checked.

Procedure

- Unscrew the union nut of the high pressure line of the cylinder to be checked at the fuel high pressure reservoir.
- Slightly slacken the union nut of the high pressure line of the injection unit to be checked, while doing so hold the connection fitting with an open-end wrench.
- Close the open connection of the high pressure line with a suitable screw plug.
- Close the open connection fitting at the fuel high pressure reservoir with the screw plug -T40204- .
- Delete all the entries stored in the fault memory for the engine control unit ⇒ Vehicle diagnostic, testing and information system VAS 5051.
- Perform a test drive.



Note

- ◆ *If the correct injection unit is found, no event log entry related to the „positive control deviation“ must be stored.*
- ◆ *It is possible that other event log entries are made. Do not pay attention to these new event log entries (follow-up fault).*
- After the test drive, read out all the entries stored in the fault memory for the engine control unit ⇒ Vehicle diagnostic, testing and information system VAS 5051.

If an entry related to the „positive control deviation“ is present in the fault memory:

- Reconnect the high pressure line to the checked injection unit ⇒ [page 199](#) .
- Repeat the work procedure for the next injection unit ⇒ [page 195](#) .

If no event entry „positive control deviation“ is stored in the fault memory after the test drive, the correct injection unit was found.

- Replace injection unit ⇒ [page 196](#) .



Note

After deleting the fault memory of the engine control unit the readiness code must be checked, if necessary re-generated ⇒ Vehicle diagnostic, testing and information system VAS 5051.



2.8 Removing and installing the injection units

Special tools and workshop equipment required

- ◆ Extractor -T10055-
- ◆ Assembly sleeve -T10377-
- ◆ Extractor -T10415-

Removing



Note

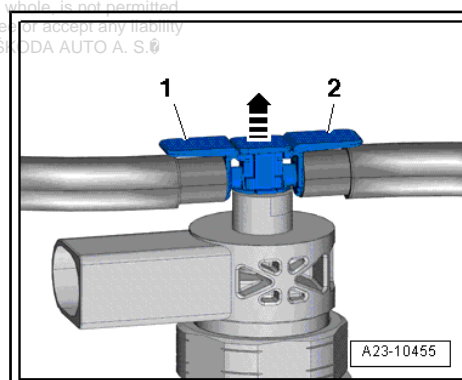
- ◆ *Safety precautions when working on the fuel supply system*
⇒ [page 3](#) .
- ◆ *Observe rules for cleanliness* ⇒ [page 4](#) .
- Remove engine cover ⇒ [page 7](#) .



Caution

- ◆ *Mark the assignment of the injection units to the cylinders. They must only be re-used on the same cylinder.*
- ◆ *Immediately close the open connections with suitable caps.*

- Detach the return-flow line connections at the injection units.
To do so, press down the clamps -1- and -2- and at the same time pull up the unlocking bolt -arrow-.



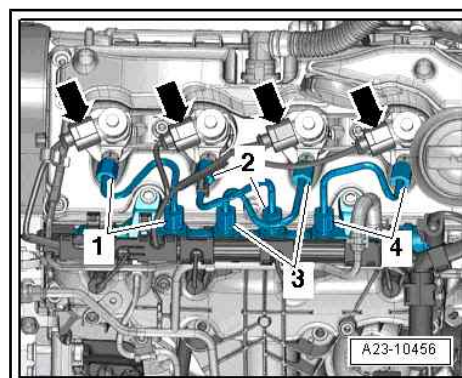
- Disconnect the plug -arrows- at the injection units.



Caution

When slackening the union nuts for the high pressure lines, counterhold the connection fitting with a lateral wrench. If the connection fitting loosens, this can cause leakage.

- Unscrew the union nuts of the relevant high pressure line -1, 2, 3- or -4- and remove the corresponding high pressure line.

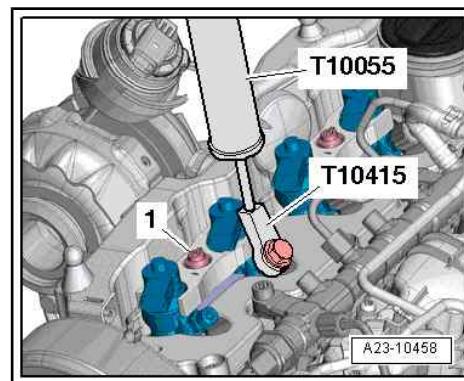


- Release the screw -1- of the clamping claw for the injection unit to be removed.
- Position the extractor -T10055- with the extractor -T10415- and pull out the injection unit towards the top by tapping it.



Note

- ◆ *In order not to damage the sealing lip, pull out the injection unit with rotary movements.*
- ◆ *Place the removed injection units on a clean cloth.*



Important instructions for the replacement of parts

When reinstalling the injection unit, the following parts must be replaced:

- ◆ Copper seal
- ◆ O-ring for gasket of bore in cylinder head
- ◆ O-ring for fuel return-flow line
- ◆ Screw for clamping claw

When installing the new injection unit (the injector), the following must also be replaced:

- ◆ Clamping claw
- ◆ High pressure line of cylinder

Instructions for reinstalling the injection units (injectors)



Note

- ◆ *When reinstalling, the removed injection units, the high pressure lines and the clamping claws must only be installed again at the same point.*
- ◆ *The reinstalled injection units (injectors) or high pressure lines must not be damaged.*
- Spray the tip of the injection unit with a rust solvent spray. Remove the soot and grease particles with a cloth after approx. 5 minutes.
- Remove the old copper seal from the injection unit; to do so, carefully tighten the copper seal in a vice until the copper seal does no longer turn. Then pull the injection unit out of the copper seal with slight turning and pulling movements of the hand.
- Check the injection units and the fitting positions for cleanliness before installing.

Mounting sequence



Note

- ◆ *All the O-rings must be coated with engine oil before installing.*
- ◆ *Carefully check all the parts and the fitting positions for cleanliness before installing.*
- Clean the channel with a cloth soaked in engine oil or rust solvent in order to remove the soot particles on the contact surface of the injection unit in the cylinder head.

**Caution**

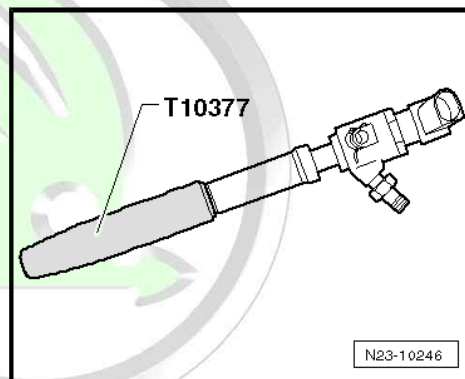
Make sure the sealing surfaces are not damaged in the process.

- Insert the new copper gasket ring at the injection unit (injector) using a plastic bush.
- Replace the O-ring for the channel of the injection unit (injector), to do so use the assembly sleeve -T10377- .
- Carefully slide the new and oiled O-ring onto the fuel return-flow connection.

**Caution**

Pay particular attention in order to avoid unnecessary installation work or consequential damage.

Avoid damage and contact of the injection units (injectors) with the cylinder head.



- Always insert 2 injection units (injectors) with clamping claw carefully into the holes of the cylinder head, while doing so observe the fitting position.
- Screw in the new fixing screw of the clamping claw and only slightly tighten to tightening torque of maximum 1 - 2 Nm.

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**Note**

In order to install the high pressure line free of stress, it must be possible to align the injection unit (the injector) by turning it slightly.

- Install the high pressure line free of stress, to do so, align the position of the injection unit (the injector) by turning it slightly. Only tighten the union nuts by hand.
- Tighten the fixing screw of the clamping claw. Tightening torque and tightening order ➔ [page 191](#) .
- Tighten the union nuts of the high pressure lines. Tightening torque and tightening order ➔ [page 191](#) .
- Carefully press the connection of the fuel return-flow line via the gasket ring onto the injection unit.
- The cap must click audibly into place.
- Afterwards carefully press the unlocking bolt downwards.

**Note**

After replacing one or several injection units (injectors), carry out the adaptation „injector quantity adjustment IQA“ and „injector voltage adjustment IVA“ ➔ Vehicle diagnostic, testing and information system VAS 5051.

- Fill up the fuel system ➔ [page 189](#) .

2.9 Installing the high pressure lines

Special tools and workshop equipment required

- ◆ Socket wrench insert -T40055-



Caution

- ◆ *Slacken the fuel high pressure reservoir for improved and stress-free positioning of the high pressure line. If necessary, slightly move the fuel high pressure reservoir.*
- ◆ *Slacken the fuel high pressure reservoir as well as the clamping claws of the injection units for improved and stress-free installation of the high pressure lines. If necessary, slightly move the fuel high pressure reservoir and if necessary slightly twist the relevant injection unit.*
- ◆ *The high pressure lines must on no account be bent or installed under tension. Tensions would eventually lead to a fracture of the corresponding high pressure line.*



Note

The installation of new high pressure lines is described in the following. If previously installed high pressure lines are re-used, they must not be damaged. Before the installation, they must be carefully checked ⇒ [Item 15 \(page 193\)](#) and ⇒ [Item 9 \(page 192\)](#) , the work procedure is otherwise the same.

- Slacken the fixing screws of the fuel high pressure reservoir in order to push it.
- Loosen the fixing screws of the clamping claws in order to turn the injection units.
- Remove the new high pressure lines from their wrapping. Remove the screw plugs and install the high pressure lines at the connection fittings without placing them down.



Note

First of all, install the high pressure lines between the injection units and the fuel high pressure reservoir, then install the high pressure lines between the high pressure pump and the fuel high pressure reservoir.

- First tighten the union nuts of the high pressure lines in the prescribed order ⇒ [page 200](#) by hand up to the „stop“. When doing this, ensure that the pipe cones are correctly seated in the connection fittings.

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Note

Tighten the union nuts of the high pressure lines using the socket wrench insert -T40055- .

- Tighten the fixing screws and the union nuts of the high pressure lines according to the prescribed work procedure ⇒ [page 200](#) .
- Carefully press the connection of the fuel return-flow line via the new gasket rings onto the injection unit.



- The cap must click audibly into place.
- Press down the unlocking bolts.
- Fill up the fuel system ➤ [page 189](#) .

Mounting sequence

Tightening order	Tightening torque
1. Screws of clamping claws for injection units	8 Nm + torque a further 180° (1/2 turn)
2.1. Union nuts of the high pressure lines at the connection fittings of the injection units	15 Nm + torque a further 60° (1/6 turn) ¹⁾
2.2. Union nuts of the high pressure lines at the connection fittings of the fuel high pressure reservoir	15 Nm + torque a further 60° (1/6 turn) ¹⁾
3.1. Union nuts of the high pressure line at the connection fitting of the high pressure pump	15 Nm + torque a further 60° (1/6 turn) ¹⁾
3.2. Union nuts of the high pressure line at the connection fitting of the fuel high pressure reservoir	15 Nm + torque a further 60° (1/6 turn) ¹⁾
4. Fixing screws of the fuel high pressure reservoir	22 Nm
5. The screws of the clamp for the high pressure line	8 Nm

¹⁾ Tighten union nuts in one work step without time delay between tightening and torquing angle (max. 1 min).

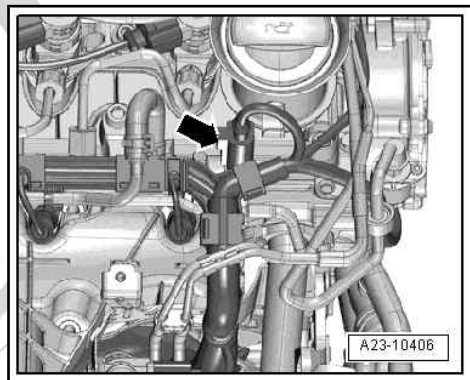
2.10 Removing and installing fuel high pressure reservoir

Removing



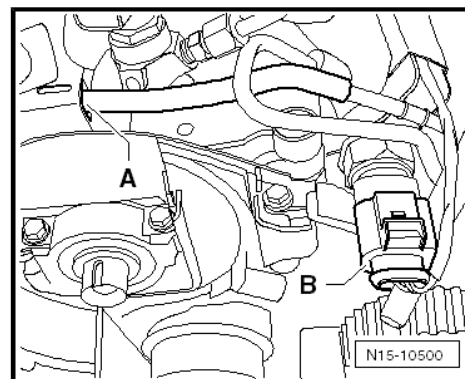
Note

- ♦ *Safety precautions when working on the fuel supply system*
➤ [page 3](#) .
- ♦ *Observe rules for cleanliness* ➤ [page 4](#) .
- Remove engine cover ➤ [page 7](#) .
- Disconnect the plug -arrow- at the fuel pressure regulating valve -N276- .

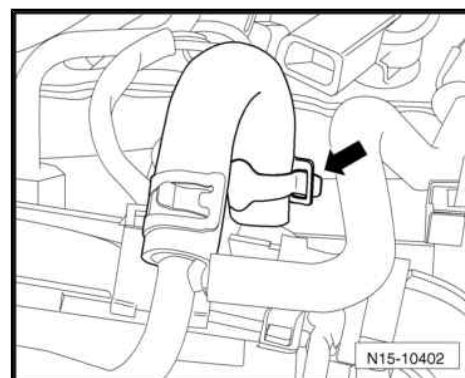


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- Disconnect plug -B- at fuel pressure sender -G247- .
- Detach the vacuum hose -A- from the cylinder head cover.



- Remove the fuel return hose from the fuel high pressure reservoir, to do so slacken the hose clamp -arrow-.
- Disconnect the plugs at the glow plugs ➔ [page 238](#) .

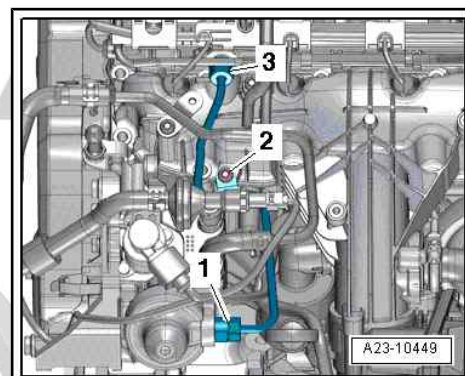


- Release screw -2- and union nuts -1- and -3-.
- Remove high pressure line.
- Remove the cable line from the fuel high pressure reservoir and lay it to the side.

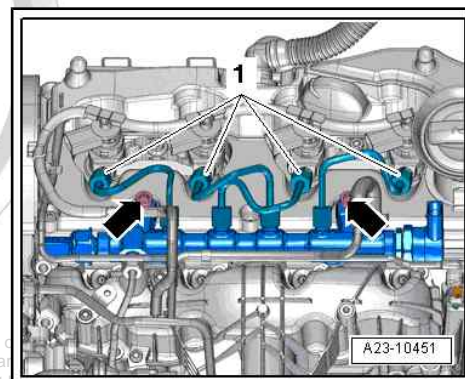


Caution

When slackening the union nuts of the high pressure line, hold the connection fitting with an open-end wrench. If the connection fitting loosens, this can cause leakage.



- Unscrew the union nuts -1- of the high pressure lines from the injection units.



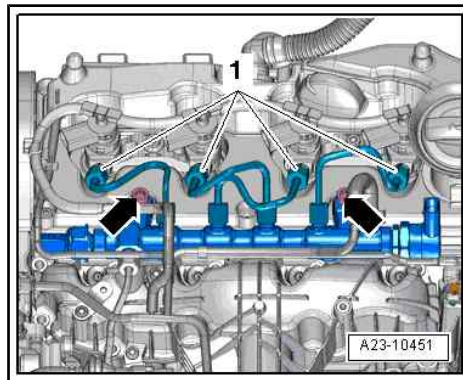


- Release fixing screws -arrows- and remove the fuel high pressure reservoir.

Install

Installation is performed in the reverse order, pay attention to the following points:

- Tightening torques ➔ [page 191](#) and ➔ [page 186](#) .
- Install high pressure lines free of stress ➔ [page 199](#) .



2.11 Removing and installing fuel pressure sender -G247-

The fuel pressure sender -G247- is located in the fuel high pressure reservoir. It measures the current fuel pressure in the high pressure system and delivers a voltage signal to the engine control unit -J623- .

If the sender fails, the pressure regulation is controlled by the engine control unit via a characteristic diagram; in case of emergency, the maximum engine speed is limited to approx. 3000 rpm.

Special tools and workshop equipment required

- ◆ Cleaning and degreasing agent , e.g. -D 000 401 04-
- ◆ Protective goggles and gloves

Removing



Note

- ◆ *Safety precautions when working on the fuel supply system*
➔ [page 3](#) .
- ◆ *Observe rules for cleanliness* ➔ [page 4](#) .
- Remove engine cover ➔ [page 7](#) .



WARNING

Wear protective gloves and protective goggles when working with grease remover!



Note

No grease remover must get into the plug connection, carefully clean.

- Before removing the fuel pressure sender -G247- , clean the thread area with a grease remover. (No dirt must get into the hole of the fuel high pressure reservoir).
- Dry the fuel pressure sender -G247- .
- Disconnect plug at fuel pressure sender -G247- .



Caution

Do not slacken the fuel pressure sender using the open-end wrench or the open ring spanner - Risk of damage!

Use lengthened socket insert.

- Unscrew the fuel pressure sender -G247- .
- Remove dirt from thread hole and sealing surface on the fuel high pressure reservoir. To do so do not use any mechanical tools.



Note

Close the hole in the fuel high pressure reservoir immediately with a suitable screw plug in order to prevent dirt from penetrating.

Install



Note

- ◆ *The fuel pressure sender -G247- has no gasket ring but a biting edge for sealing.*
- ◆ *Pay attention to damage of the biting edge and the thread of the new fuel pressure sender -G247- . It is possible to use the fuel pressure sender -G247- again.*
- ◆ *Also check the sealing surface of the hole at the fuel high pressure reservoir.*



Caution

Do not tighten the fuel pressure sender using the open-end wrench or the open ring spanner - Risk of damage!

Use lengthened socket insert.

- Screw in fuel pressure sender -G247- by hand.

Tightening torque: ➔ [page 186](#)

- Check fuel system for tightness ➔ [page 190](#) .

2.12 Check the low pressure fuel system

Special tools and workshop equipment required

- ◆ Pressure gauge , e.g. -V.A.G 1318-

Test conditions

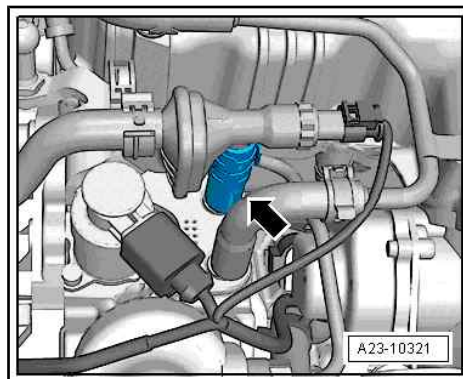
- Battery voltage at least 12.5 V.
- Fuel filter o.k.
- Fuel tank at least $\frac{1}{2}$ full.

Test holding pressure

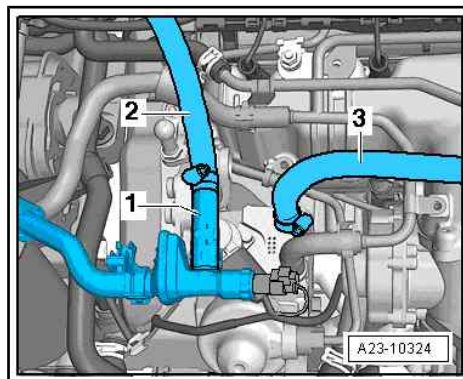
Observe the rules for cleanliness and the instructions when undertaking all work on the fuel system ➔ [page 2](#) .



- Remove engine cover ➔ [page 7](#) .
- Remove the fuel feed line -arrow- from the high pressure pump, to do so slacken the hose clamp.



- Connect the pressure gauge -V.A.G 1318- with the suitable adapter -2- to the fuel feed line -1-.
- Connect the second hose -3- to the pressure gauge -V.A.G 1318- at the open connection of the high pressure pump as shown in the following figure.



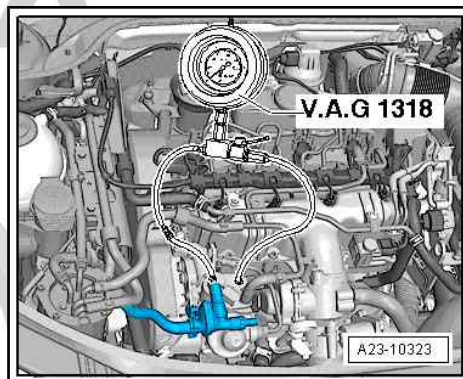
Note

The pressure gauge -V.A.G 1318- is interposed in the fuel feed line.

- Connect vehicle diagnosis, measurement and information system -VAS 505x- .
- Switch on ignition.
- Select the „Engine electronics“ in the self-diagnosis.
- Then select „Basic setting“.
- Select „Test of fuel pump“ in the selection list.
- Leave the fuel pumps running until the highest fuel pressure has built up.
- Specified value: min. 0.35 MPa (3.5 bar)

If the specified value is not reached, this may be due to the following causes:

- ♦ The fuel filter is clogged.
- ♦ The battery voltage is low.
- Check the fuel flow rate of the fuel pump ➔ [page 157](#) .



Note

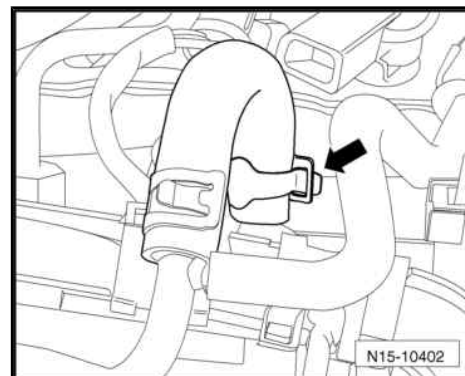
Check fuel system for cable damage and leaks.

2.13 Check fuel pressure regulating valve - N276-



Note

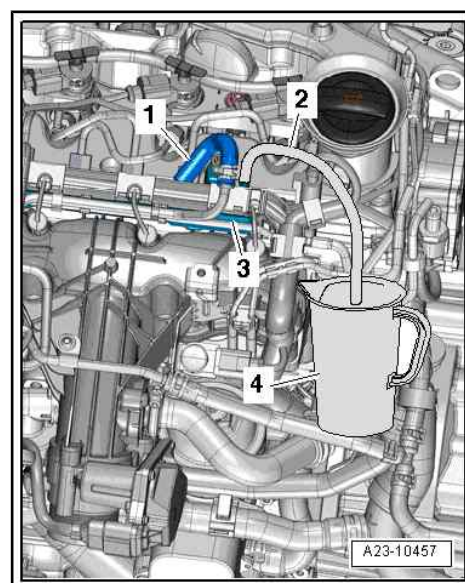
- ◆ *Safety precautions when working on the fuel supply system*
⇒ [page 3](#) .
- ◆ *Observe rules for cleanliness* ⇒ [page 4](#) .
- Remove engine cover ⇒ [page 7](#) .
- Remove the fuel return hose from the fuel high pressure reservoir, to do so slacken the hose clamp -arrow-.
- Close the detached fuel return flow hose with a suitable plug.



- Connect the auxiliary hose -2- to the return-flow connection of the fuel high pressure reservoir -3-.
- Hold the auxiliary hose in a measuring vessel -4- in order to measure the return flow quantity.
- Start engine and run for 30 seconds at idling speed.
- Specified value: 90 ... 110 ml

If the specified value is not reached, the fuel pressure regulating valve -N276- is defective.

- Replace fuel pressure regulating valve -N276- ⇒ [page 205](#) .



2.14 Replace fuel pressure regulating valve - N276-

The fuel pressure regulating valve -N276- is installed in the fuel high pressure reservoir and provides a constant pressure in the high-pressure fuel circuit.

If the pressure in the high-pressure fuel circuit is too high, the regulating valve opens and some of the fuel from the fuel high pressure reservoir flows back into the fuel tank via the fuel return-flow line.

The pressure control valve closes if there is too low a pressure in the high-pressure fuel circuit and thus seals the high-pressure side from the low-pressure side.

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Note

The fuel pressure regulating valve -N276- is not reusable.

Special tools and workshop equipment required

- ◆ Cleaning and degreasing agent , e.g. -D 000 401 04-
- ◆ Protective goggles and gloves

Removing



Note

- ◆ *Safety precautions when working on the fuel supply system*
⇒ [page 3](#) .
- ◆ *Observe rules for cleanliness ⇒ [page 4](#) .*
- Remove engine cover ⇒ [page 7](#) .



WARNING

Wear protective gloves and protective goggles when working with grease remover!



Note

No grease remover must get into the plug connection, carefully clean.

- Also clean the thread area of the fuel pressure regulating valve -N276- with a grease remover - no dirt must get into the hole of the fuel high pressure reservoir.
- Dry fuel pressure regulating valve -N276-
- Disconnect the plug at the fuel pressure regulating valve - N276- .
- Counterhold the fuel pressure regulating valve -N276- on the hexagon and slacken the screwed connection using a wrench.
- Unscrew the screwed connection by hand and remove the fuel pressure regulating valve -N276- from the fuel high pressure reservoir.
- Remove dirt from the thread, the sealing surface and the hole in the fuel high pressure reservoir. To do so do not use any mechanical tools.



Note

Close the hole in the fuel high pressure reservoir immediately with a suitable screw plug in order to prevent dirt from penetrating.

Install



Note

- ◆ *The fuel pressure regulating valve -N276- does not have a gasket ring but a biting edge.*
 - ◆ *The fuel pressure regulating valve -N276- is not reusable.*
 - ◆ *The O-ring seals the high-pressure side from the low-pressure side and must be replaced.*
 - ◆ *Before installing, moisten the O-ring and the hole in the fuel high pressure reservoir with diesel fuel.*
 - ◆ *Pay attention to damage of the biting edge and the thread of the new fuel pressure regulating valve -N276-.*
 - ◆ *Also check the sealing surface at the fuel high pressure reservoir.*
 - Screw in the screwed connection and tighten by hand.
 - Align the fuel pressure regulating valve -N276- in such a way that the connecting line is routed tension-free after fitting on the plug.
 - Counterhold the fuel pressure regulating valve -N276- on the hexagon and tighten the screwed connection using a wrench.
- Tightening torque: ➔ [page 186](#)
- Check fuel system for tightness ➔ [page 190](#) .

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3 Intake manifold, air filter

3.1 Intake manifold with component parts - Summary of components

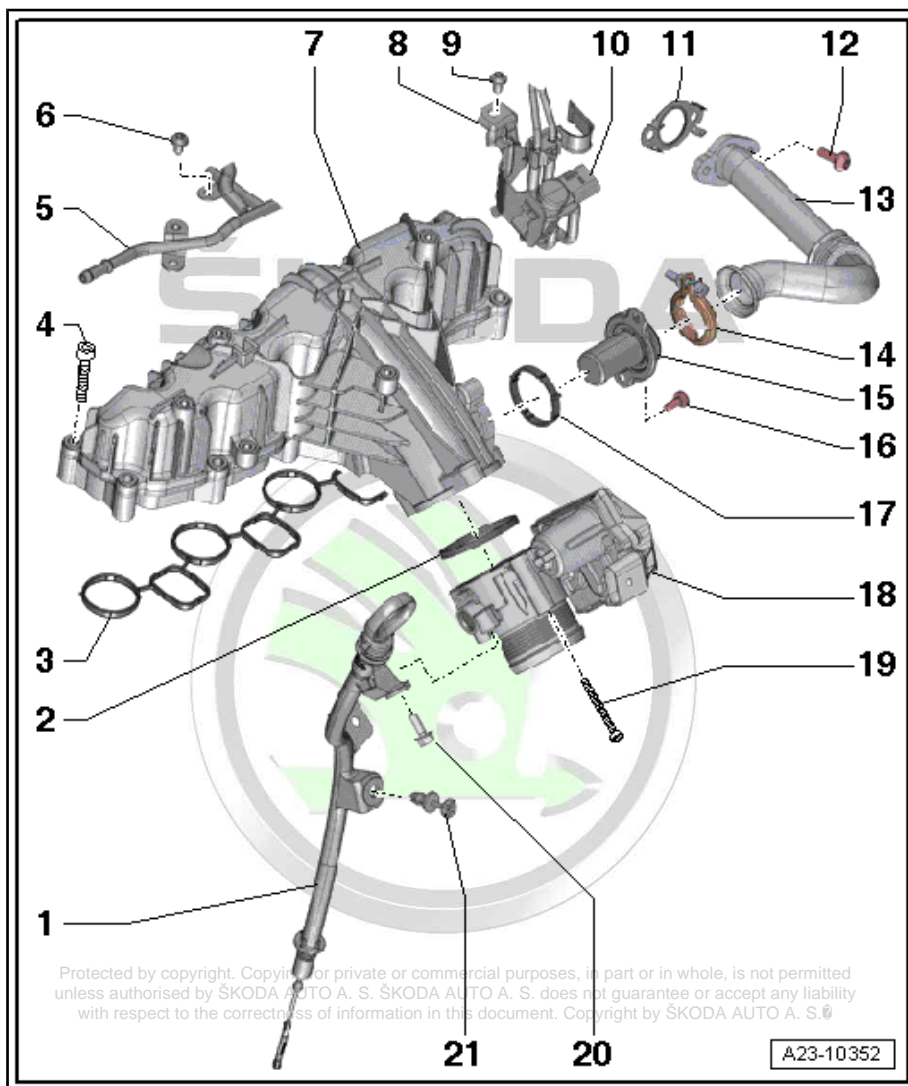
- 1 - Dipstick
 - ☐ with guide pipe
- 2 - Sealing ring
 - ☐ replace
- 3 - Gasket
 - ☐ replace
- 4 - 8 Nm
- 5 - Fuel return-flow line
- 6 - 9 Nm
- 7 - Intake manifold
 - ☐ removing and installing
⇒ [page 210](#)
- 8 - Support
 - ☐ for changeover valve for radiator of exhaust gas recirculation -N345-
- 9 - 9 Nm
- 10 - Changeover valve for radiator of exhaust gas recirculation -N345-
- 11 - Gasket
 - ☐ replace
- 12 - 20 Nm
- 13 - Connecting pipe
 - ☐ to radiator for exhaust gas recirculation



Caution

Pay attention that the bellows of the connection pipe is not bent or overstretched. There is a risk of crack formation.

- 14 - Warm-type clamp, 5 Nm
 - ☐ replace
- 15 - Supports
 - ☐ for exhaust gas recirculation
- 16 - 8 Nm
- 17 - Sealing ring
 - ☐ replace
- 18 - Throttle valve control unit -J338-
 - ☐ removing and installing ⇒ [page 209](#)



19 - 8 Nm

20 - 10 Nm

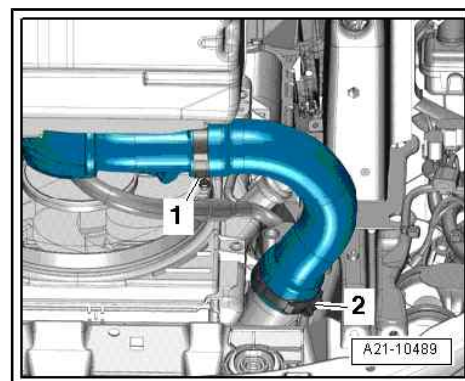
21 - Clip

- for oil dipstick guide pipe

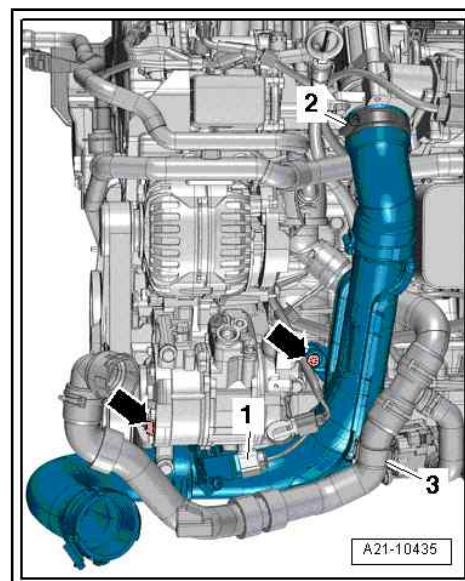
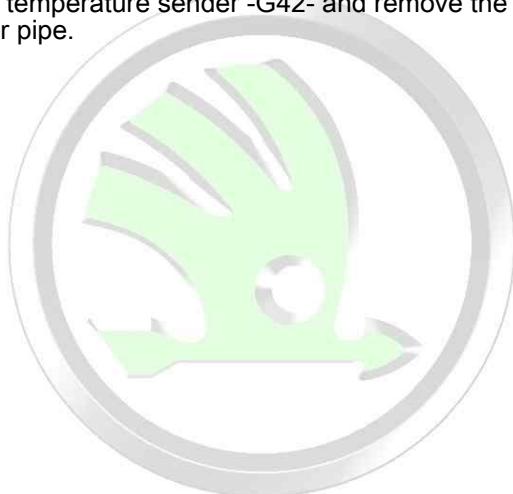
3.2 Removing and installing the throttle valve control unit -J338-

Removing

- Remove engine cover ⇒ [page 7](#) .
- Remove noise insulation ⇒ Body Work ⇒ Rep. gr. 50 .
- Remove the charge air hose, to do so slacken the screw clamps -1 and 2-.



- Release screws -arrows-.
- Expose coolant hose -3-.
- Loosen hose clamp -2-.
- Disconnect the plug -1- at the charge pressure sender -G31- / intake air temperature sender -G42- and remove the right charge air pipe.



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- Disconnect the plug -2- from the throttle valve control unit - J338 - .
- Release screw -1- of guide pipe for oil dipstick.
- Release screws -arrows- and remove throttle valve control unit -J338- .

Install

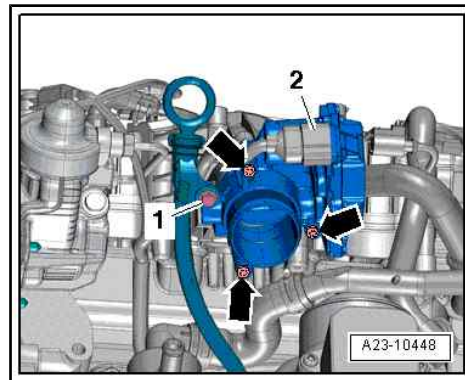
Installation is performed in the reverse order, pay attention to the following points:

- Tightening torques ⇒ [page 208](#) .



Note

Replace O-ring.



3.3 Removing and installing intake manifold

Special tools and workshop equipment required

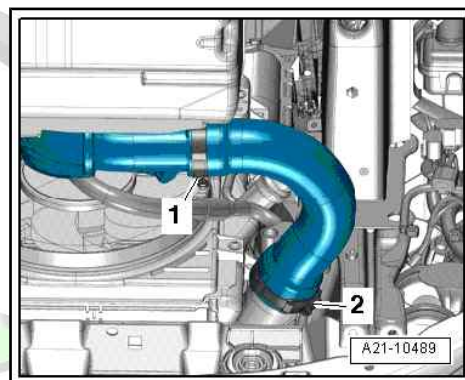
- ◆ Socket insert T30 with spherical head -T10405-

Removing



Note

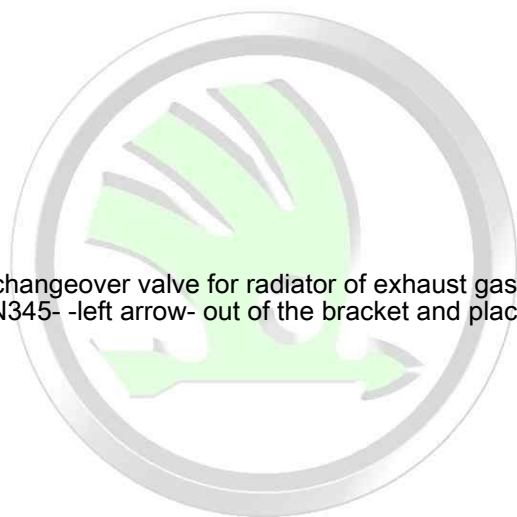
- ◆ *Safety precautions when working on the fuel supply system* ⇒ [page 3](#) .
- ◆ *Observe rules for cleanliness* ⇒ [page 4](#) .
- Remove engine cover ⇒ [page 7](#) .
- Remove noise insulation ⇒ Body Work ⇒ Rep. gr. 50 .
- Remove the charge air hose, to do so slacken the screw clamps -1 and 2-.



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- Release screws -arrows-.
- Slacken the hose clamp -2- at the throttle valve control unit - J338 -, detach the right charge air pipe and leave it in the fitting position.
- Disconnect the plugs at the glow plugs ➔ [page 238](#) .

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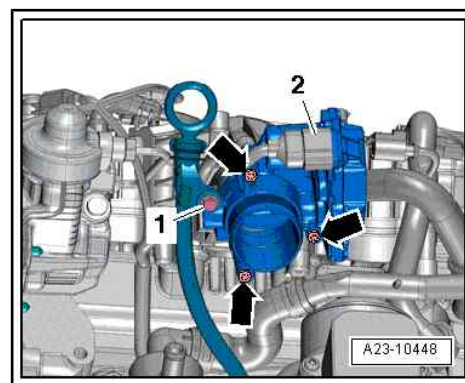
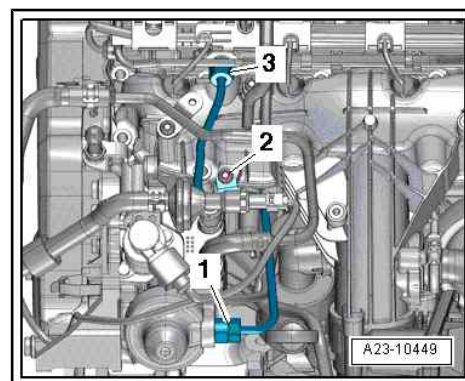
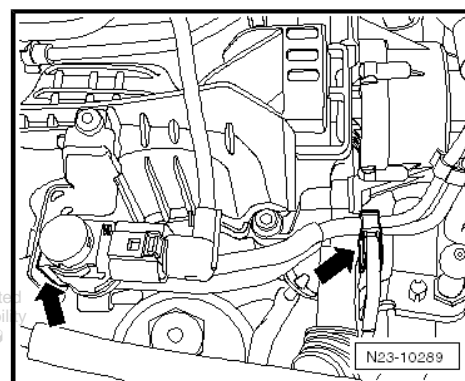
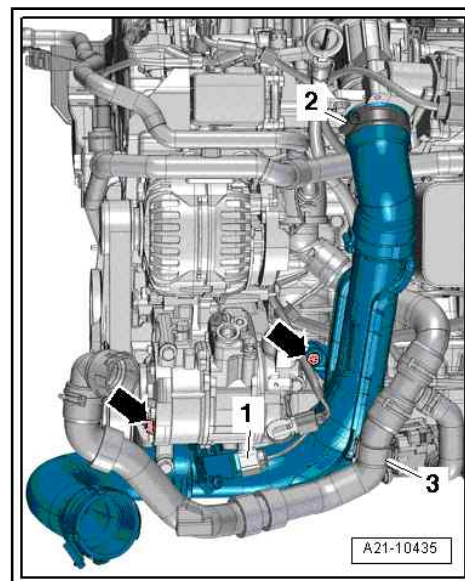


- Take the changeover valve for radiator of exhaust gas recirculation -N345- -left arrow- out of the bracket and place it to the side.

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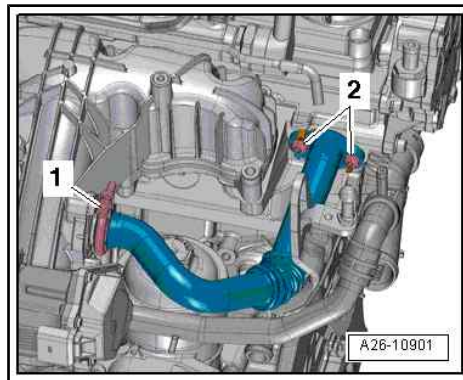
- Release screw -2- and union nuts -1- and -3- for the high pressure line and remove the high pressure line.
- Remove fuel high pressure reservoir ➔ [page 200](#) .

- Disconnect the plug -2- from the throttle valve control unit - J338 - .
- Release screw -1- of guide pipe for oil dipstick.





- Open clamp -1- and remove.



- Release the screws -arrows- for the intake manifold using the socket insert T30 with spherical head -T10405- from outside to inside and crosswise.
- Carefully remove the intake manifold.

Install

Installation is performed in the reverse order, pay attention to the following points:

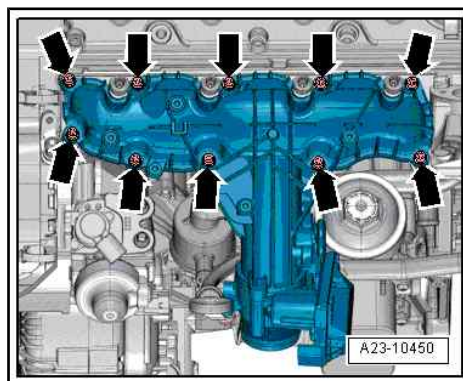
- Tightening torques ➔ [page 208](#) .



Note

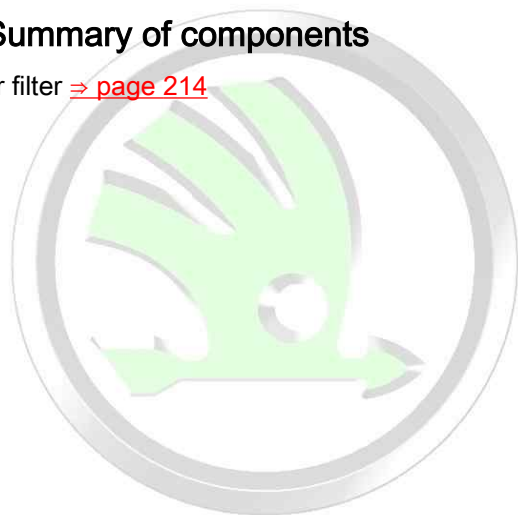
Replace gasket.

- Tighten fixing screws for intake manifold crosswise from the inside to the outside.



3.4 Air filter - Summary of components

Removing and installing air filter ➔ [page 214](#)



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1 - Air intake hose

- ☐ to exhaust gas turbo-charger

2 - Pipe support for ventilation

- ☐ with heating
- ☐ only vehicles for cold climatic zones

3 - Connecting pipe

- ☐ for crankcase ventilation
- ☐ to remove, press release buttons

4 - 2 Nm

5 - Air mass meter -G70-

6 - O-ring

- ☐ replace if damaged

7 - 2 Nm

- ☐ Fixing screws for air filter top part

8 - 8 Nm

- ☐ Fixing screw for air filter (air filter bottom part)

9 - Bushing

10 - Washer

11 - Air filter top part

12 - Air filter element

- ☐ pay attention to change intervals ⇒ Maintenance ; Booklet Octavia II

13 - Air filter bottom part

14 - Connecting piece

- ☐ for drain pipe

15 - Overflow valve

16 - Hose

- ☐ for water drainage

17 - Connecting hose

18 - Inlet connection

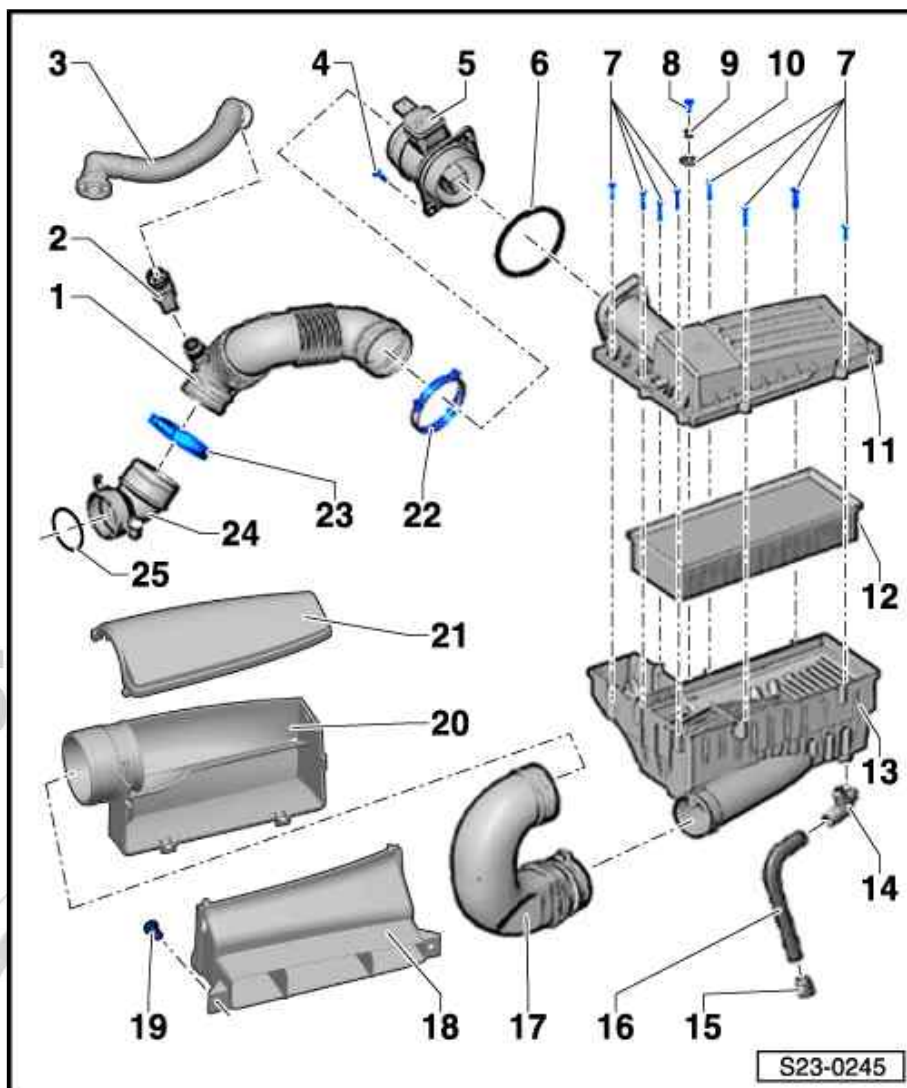
- ☐ screwed onto lock carrier
- ☐ with pinhole on engines BS-4 («monsoon hole»)

19 - 2 Nm

20 - Intake air duct

21 - Cover

- ☐ for intake air duct





22 - Spring strap clamp

23 - Spring strap clamp

24 - Inlet connection

- ☐ Observe fitting position to exhaust gas turbocharger
- ☐ with fixing screw, 9 Nm

25 - O-ring

- ☐ replace

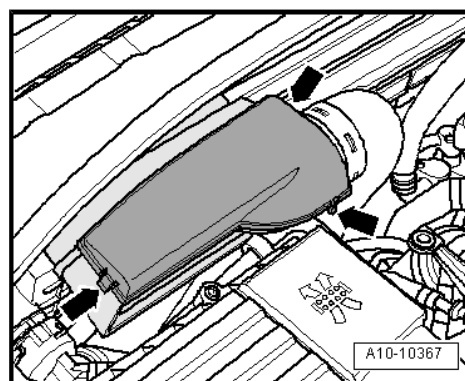
3.5 Removing and installing air filter

Special tools and workshop equipment required

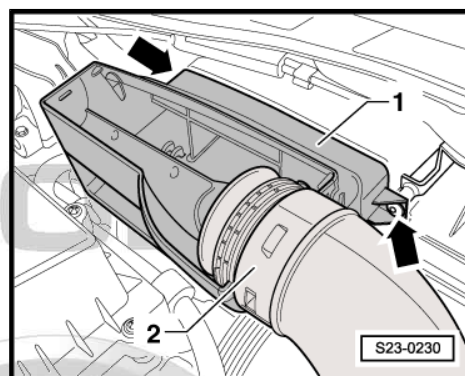
- ◆ Pliers for spring strap clamps

Removing

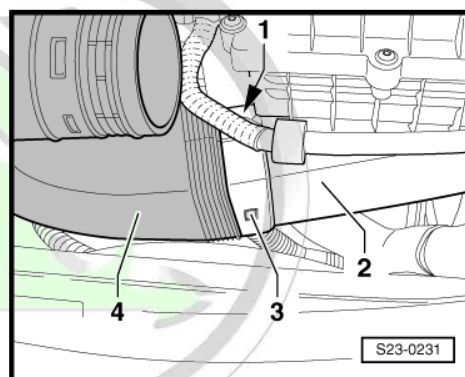
- Remove engine cover ➤ [page 7](#) .
- Remove cover for intake air duct, to do so release lateral securing tabs -arrows-.



- Release screws -arrows- for connection fitting -1- and take connecting hose -2- out of the guide.



- Press in catches -1- and -3- and pull off connecting hose -4- from air filter -2-.



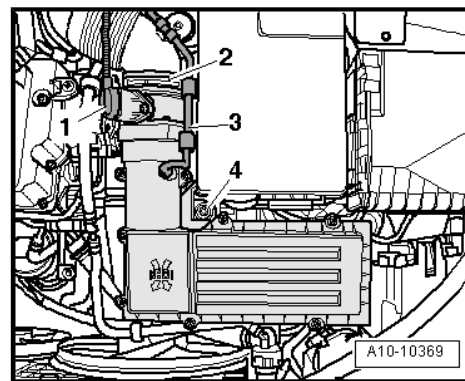
- Unplug connector -1- from air mass meter -G70- .
- Detach vacuum hose -3- and suction hose -2-.
- Release screw -4- and remove air filter with air mass meter -G70- .

Remove suction hose

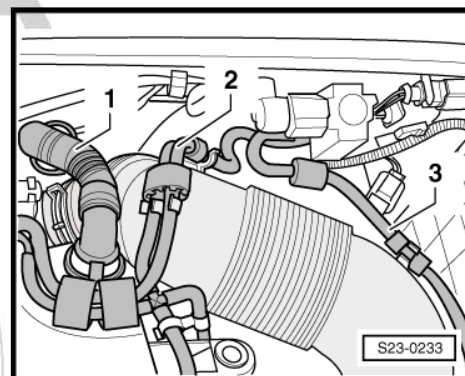


Note

Due to the poor access of the pliers for spring strap clamps to the bottom suction hose it is preferable to remove the inlet connection from the exhaust turbocharger.



- Unclip vacuum lines -2- and -3- from suction hose.
- Remove connecting pipe for crankcase ventilation -1-.



- Fully release screw of inlet connection -2-.
- Swivel the inlet connection -3- in the -direction of the arrow A- and remove it with the suction hose -1-.

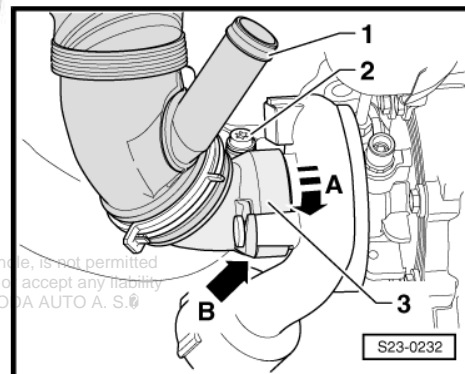
Install

Installation is performed in the reverse order, pay attention to the following points:



Note

- ◆ Replace O-ring.
- ◆ When installing the inlet connection -3- at the exhaust gas turbocharger, make sure that the inlet connection is correctly seated on the bolt -arrow B-.





4 Engine control unit

4.1 Removing and installing engine control unit



Note

If the engine control unit should be replaced, connect the vehicle diagnosis, measurement and information system -VAS 5051- and in the targeted fault finding carry out „replace engine control unit“.

Special tools and workshop equipment required

- ◆ Body saw e.g. -V.A.G 1523 A-

Removing

- Switch off ignition.
- Remove the cooling water tank cover ⇒ Body Work ⇒ Rep. gr. 66 .
- Remove bulkhead plenum chamber -arrows-.
- Remove windscreen wiper and washer system ⇒ Electrical System ⇒ Rep. gr. 92 .

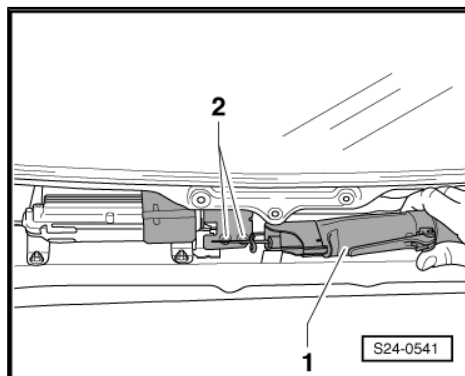
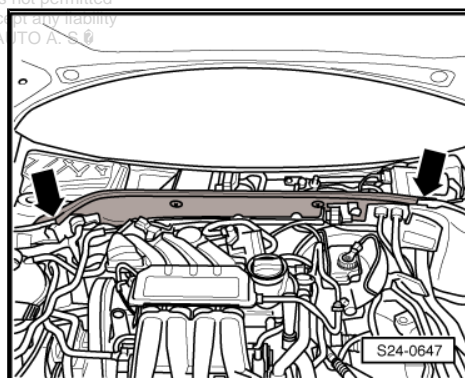
For vehicles with protective cover

- Cut with body saw -1- a slot for the cross-head screwdriver in the heads of the pull-off screws -2-.



Note

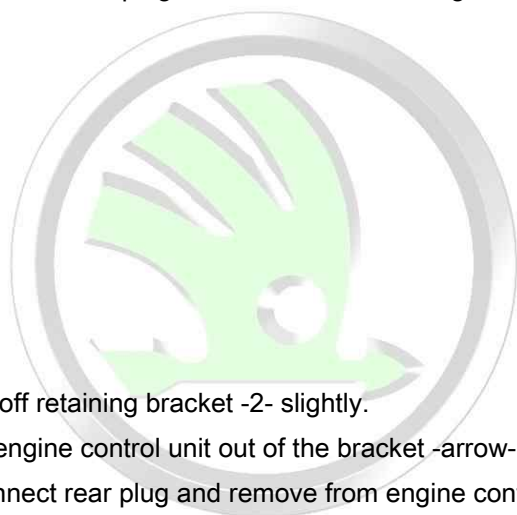
- ◆ *It must be sawed twice with the body saw, so that the slot is wide enough, in order to be able to unscrew the screws with a suitable screwdriver.*
- ◆ *The pull-off screws until are inserted with locking agent.*
- Unscrew bolts -2-.



- Lift locking tab of protective cover with a cross-head screw-driver.
- Push the protective cover in the -direction of the arrow- out of the bracket for engine control unit.

Continued for all vehicles

- Disconnect front plug -1- and remove from engine control unit.



- Lever off retaining bracket -2- slightly.
- Push engine control unit out of the bracket -arrow-.
- Disconnect rear plug and remove from engine control unit.

Install

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Note

For vehicles with protective cover, the metal swarfs must be suctioned out of the plenum chamber before installing the engine control unit.

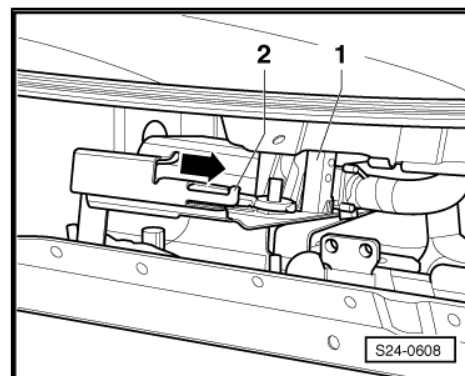
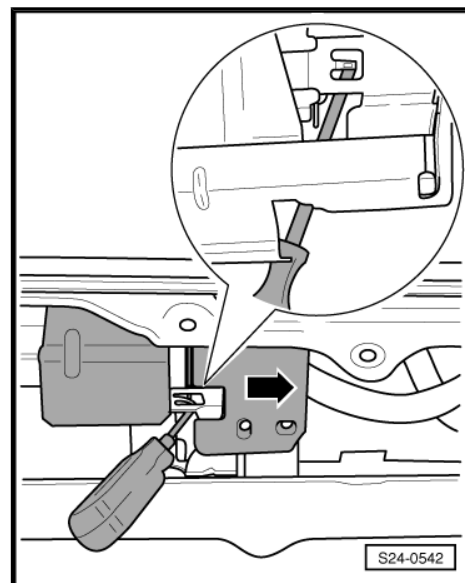
- Connect rear plug to engine control unit and lock.
- Push engine control unit into the bracket and lock the retaining bracket -2-.
- Connect front plug to engine control unit and lock.

For vehicles with protective cover

- Fasten protective cover with new pull-off screws (before tightening align the protective cover in such a way that it does not come into contact with the surrounding components)

Continued for all vehicles

- Install windscreen wiper and washer system ⇒ Electrical System ⇒ Rep. gr. 92 .
- Install bulkhead plenum chamber and plenum chamber cover ⇒ Body Work ⇒ Rep. gr. 66 .





26 – Exhaust system

1 Removing and installing parts of the exhaust system



Note

- ♦ *The decoupling element in the pre-exhaust pipe should not be bent by more than 10° - risk of damage.*
- ♦ *Replace the gaskets and the self-locking nuts.*
- ♦ *When performing installation work on the exhaust system, make sure the exhaust system is not mounted under tension and has adequate clearance from the vehicle body. If necessary slacken the double clamp and align the exhaust system so as to create adequate clearance between these components and the vehicle body, and that the weight of the exhaust system is evenly distributed over the hangers.*

1.1 Pre-exhaust pipe

1.1.1 Summary of components for engine with identification characters CFHC, CFHF



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1 - 8 Nm

2 - Support

☐ for hoses

3 - 5 Nm

4 - 8 Nm

5 - Differential pressure sender -G505-



Caution

Risk of damage!
The differential pressure sender -G505- is very sensitive and therefore requires the utmost care. It must not touch somewhere when laying it down.

Only detach the hoses from the differential pressure sender -G505- if it must be replaced.

☐ replace ➔ [page 223](#)

6 - Support

☐ for differential pressure sender -G505-

7 - Spring strap clamps

8 - Hose

9 - 9 Nm

10 - Heat shield

11 - Lambda probe -G39- , 50 Nm

☐ the thread of new lambda probes must be coated with assembly paste

☐ when installing an already used lambda probe, only coat the thread with hot bolt paste -G 052 112 A3- ; the hot bolt paste -G 052 112 A3- must not get into the slots of the probe body

☐ use wrench set 17 mm -T10395- for removing and installing

12 - Exhaust gas temperature sender 4 -G648- , 45 Nm

☐ the thread of new temperature senders must be coated with assembly paste

☐ coat thread with hot bolt paste -G 052 112 A3- before installing a used sender

☐ use wrench set 17 mm -T10395- for removing and installing

13 - Gasket

☐ replace

☐ Check fitting position

14 - Warm-type clamp, 7 Nm

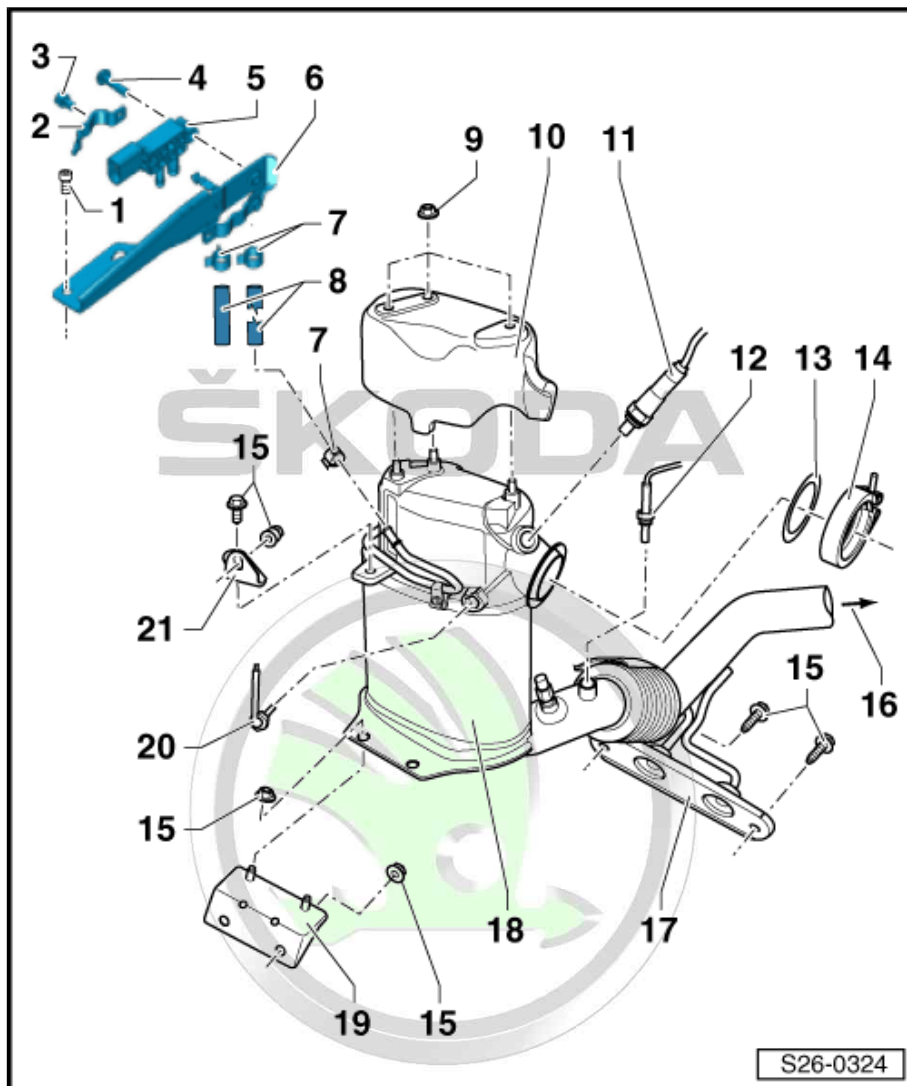
☐ replace

15 - 25 Nm

16 - to middle part of exhaust system

17 - Hanger

☐ replace if damaged



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nder 3 -G495- , 45 Nm

- 0395- for removing and installing
head
Components for engine with identification

-

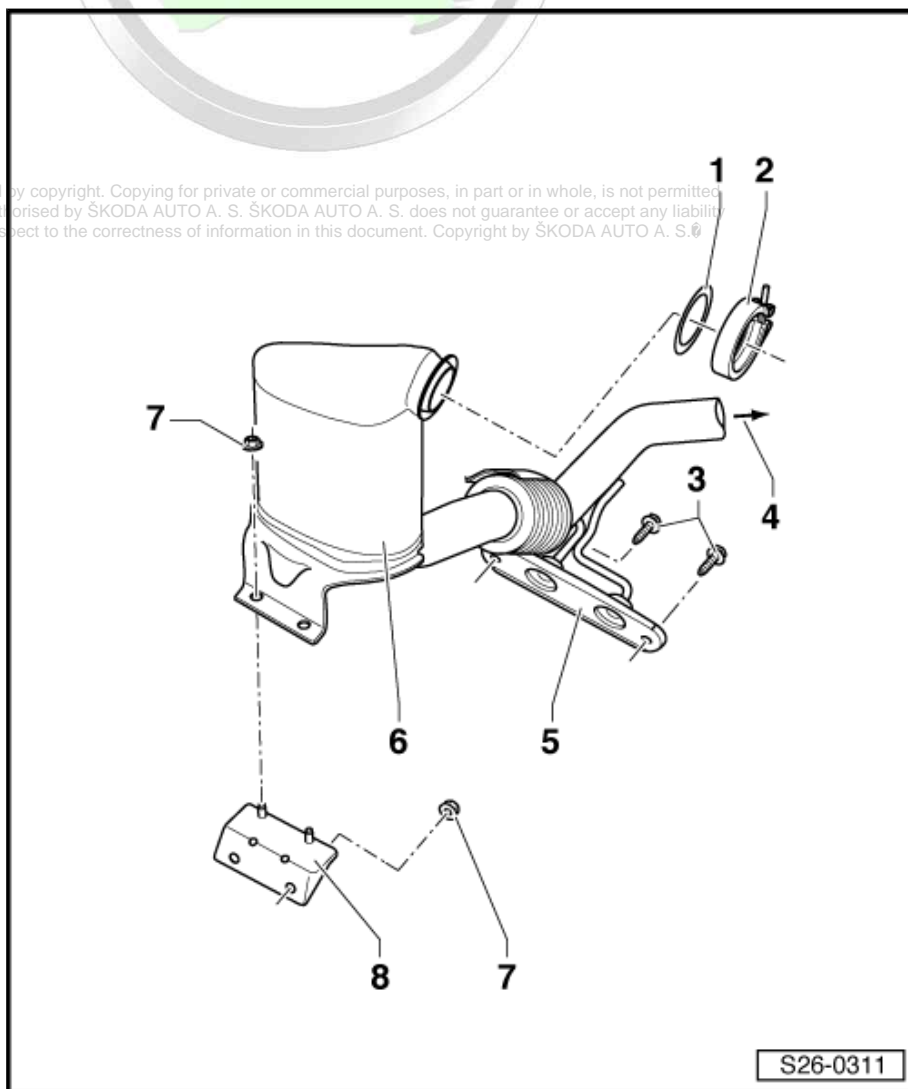
-

1117

-

-

-



1.1.3 Summary of components for engine with identification characters CLCB

1 - Gasket

- ☐ replace
- ☐ Check fitting position

2 - Warm-type clamp, 7 Nm

- ☐ replace

3 - 25 Nm

4 - to middle part of exhaust system

5 - Retaining strap

- ☐ replace if damaged

6 - Pre-exhaust pipe

- ☐ with diesel particle filter with unregulated regeneration (PMS)
- ☐ removing and installing
⇒ [page 228](#)
- ☐ after replacing, the adaptation of the ash mass balance must be set to „0“ ⇒ Vehicle diagnostic, testing and information system VAS 5051

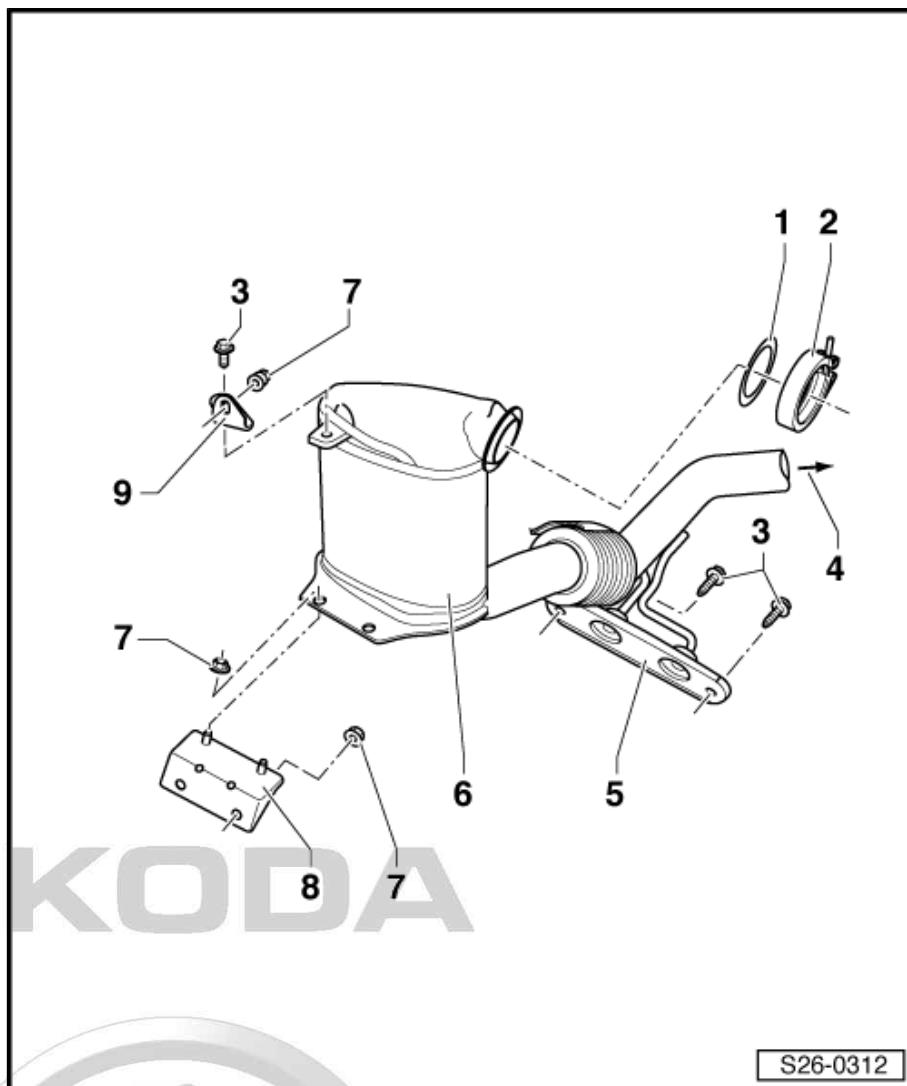
7 - 25 Nm

8 - Support

- ☐ screwed onto the cylinder block
- ☐ Replace bracket with riveted threaded bolts (the required tightening torque can only be applied in this way)

9 - Support

- ☐ screwed onto the cylinder head



1.2 Middle or rear part of the exhaust system - Summary of components

1.2.1 Summary of components for vehicles with front-wheel drive

1 - Double clamp

- ☐ align the exhaust system free of stress before tightening ⇒ [page 231](#)
- ☐ Tighten bolted connections evenly

2 - Middle part of exhaust system

- ☐ for first equipment building unit with rear part, replace individually when carrying out repairs ⇒ [page 231](#)
- ☐ Align exhaust system free of stress ⇒ [page 231](#)
- ☐ Separation point ⇒ [page 231](#)

3 - Retaining strap

- ☐ replace if damaged
- ☐ Pay attention to the part number

4 - Tunnel bridge

- ☐ rear

5 - 23 Nm

- ☐ replace

6 - Rear part of exhaust system

- ☐ for first equipment building unit with middle part, replace individually when carrying out repairs ⇒ [page 231](#)
- ☐ Align exhaust system free of stress ⇒ [page 231](#)
- ☐ Separation point ⇒ [page 231](#)

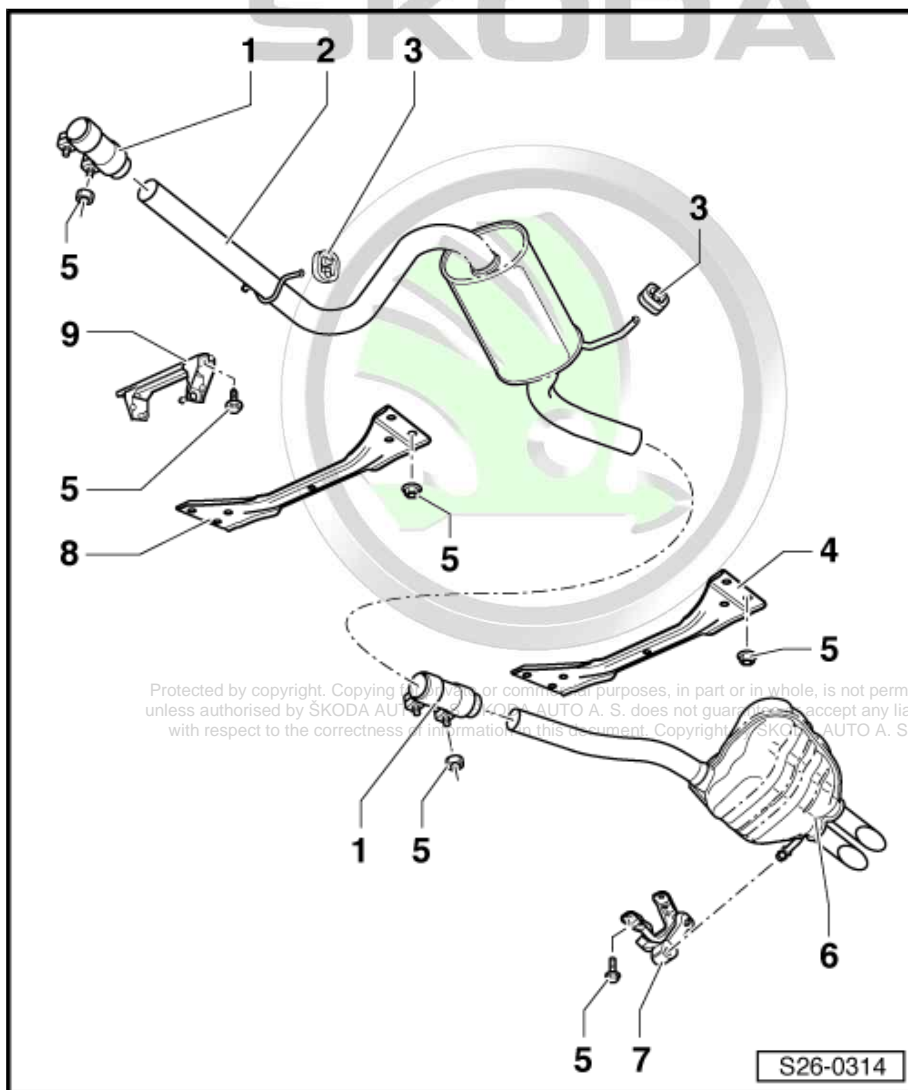
7 - Retaining strap

- ☐ replace if damaged
- ☐ Pay attention to the part number

8 - Tunnel bridge

- ☐ front

9 - Hanger



1.2.2 Summary of components for vehicles with four-wheel drive

1 - Middle and rear part of the exhaust system

- ☐ for first equipment a building unit, replace individually when carrying out repairs ⇒ [page 231](#)
- ☐ Align exhaust system free of stress ⇒ [page 231](#)
- ☐ Separation point ⇒ [page 231](#)

2 - Retaining strap

- ☐ replace if damaged
- ☐ Pay attention to the part number

3 - 23 Nm

4 - Double clamp

- ☐ align the exhaust system free of stress before tightening ⇒ [page 231](#)
- ☐ Tighten bolted connections evenly

5 - Hanger

6 - 23 Nm

7 - Tunnel bridge

- ☐ front

8 - Retaining strap

- ☐ replace if damaged
- ☐ Pay attention to the part number

9 - Tunnel bridge

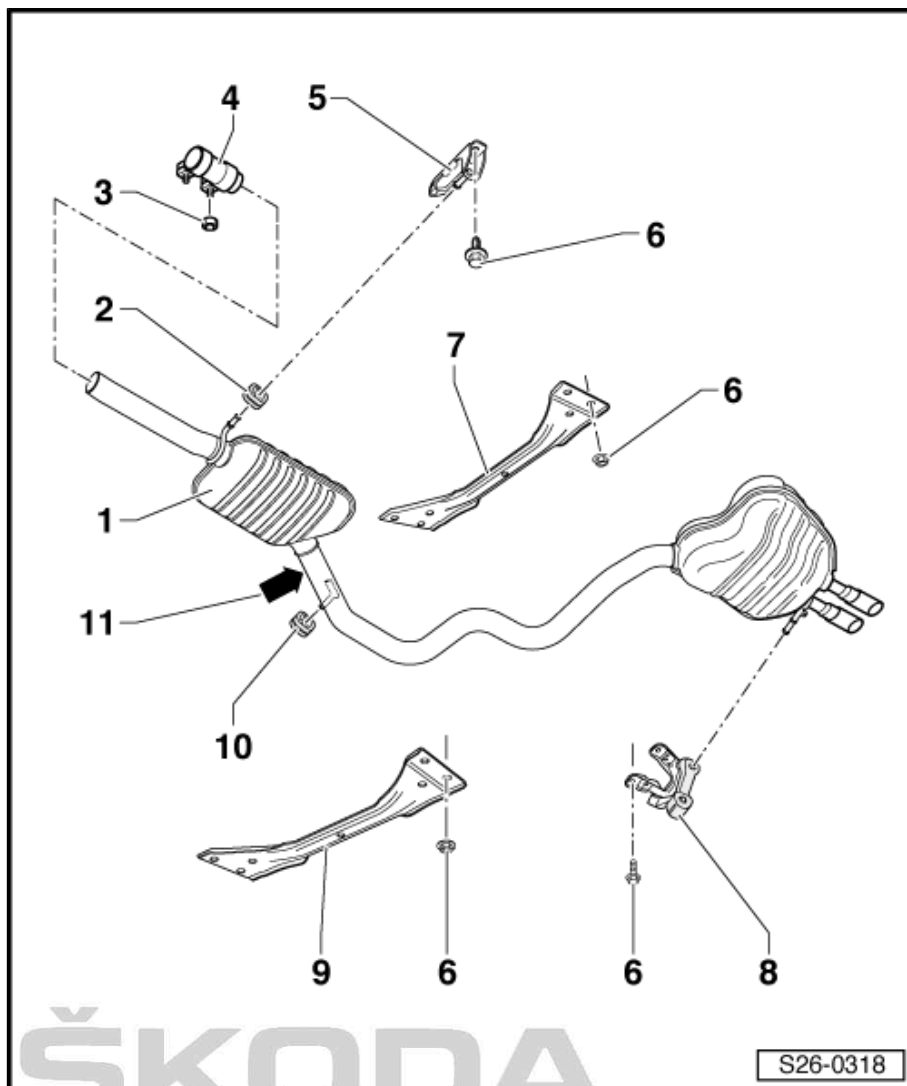
- ☐ rear

10 - Retaining strap

- ☐ replace if damaged
- ☐ Pay attention to the part number

11 - Separation point

- ☐ Separation point ⇒ [page 231](#)



1.3 Replacing differential pressure sender - G505- (for engine with engine identification characters CFHC, CFHF)

The differential pressure sender -G505- determines the volumetric efficiency of the particle filter volume. It is connected to the measuring point behind the diesel particle filter via a pressure line and to the diesel particle filter via another control line.

- If the lines or hoses are clogged with soot, which significantly constricts their cross section, then the sender together with the bracket and the connected hoses must be completely replaced.

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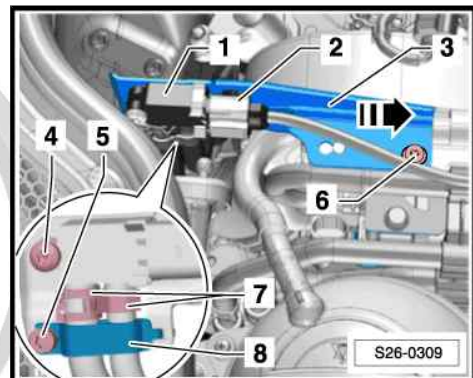
Caution

The differential pressure sender -G505- is very sensitive to shock load and leaks.

- ◆ *Therefore the hoses of the sender must only be removed if the sender is damaged.*
- ◆ *Furthermore there is the risk that the hose connections break off when the hoses are removed.*

Removing

- Remove engine cover ➔ [page 7](#) .
- Disconnect the plug -2- at the differential pressure sender - G505- -1-.
- Screw out screw -6- and the bracket -3- with the differential pressure sender -G505- from the bracket of the additional fuel pump -V393- in -direction of arrow-.
- Release screw -5- and remove bracket -8-.
- Release spring strap clamps -7- and detach the hoses from the connection fittings of the differential pressure sender - G505- -1-.
- Release screw -4- and unclip the differential pressure sender -G505- -1- from the bracket -3-.



Install

Installation is performed in the reverse order, pay attention to the following points:



Note

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- ◆ *Before installing, blow through the pressure lines to the differential pressure sender -G505- in order to avoid blockage.*
- ◆ *Pay attention to the tight fit and leaktightness of the connections.*

Tightening torques: ➔ [page 218](#)

- An adaptation must be carried out after replacing the differential pressure sender -G505- ➔ Vehicle diagnostic, testing and information system VAS 5051.

The work procedure for the adaptation is described in the „Targeted fault finding“. It is also described under „Targeted functions“.

- Select the correct vehicle in the targeted fault finding.
- Press button „Skip“.
- Press „Selected Functions/Components“.
- Select „Drive“.
- Select „01 - Self-diagnosable systems“.
- Select „01 - Engine electronics J623“.
- Select „01 - Engine electronics, functions“.
- Select „01 - Erase initialisation values (Rep. Gr. 21 - 28)“.

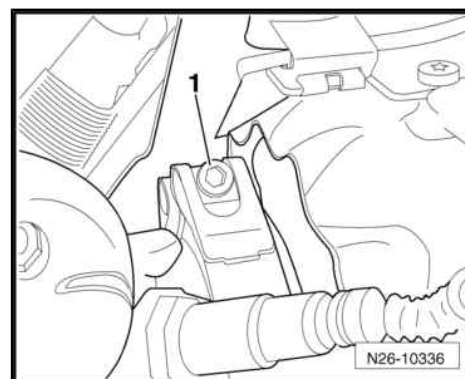
1.4 Removing and installing pre-exhaust pipe with diesel particle filter (for engine with identification characters CFHC, CFHF)

Special tools and workshop equipment required

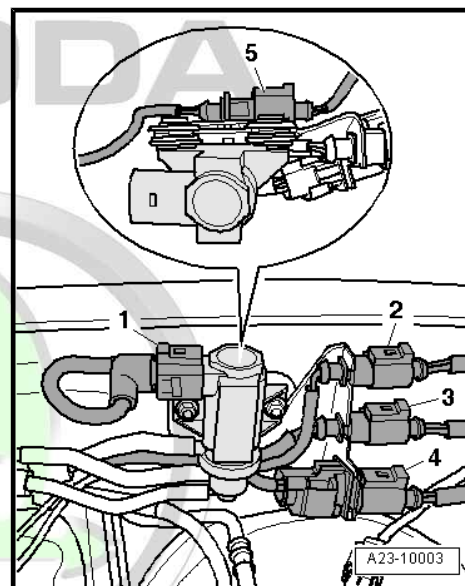
- ◆ Ratchet ring wrench -T10384-
- ◆ Ring spanner set for lambda probe
- ◆ Set of tools SW 17 -T10395-
- ◆ Transport security -T10404-
- ◆ Hot screw paste -G 052 112 A3-

Removing

- Remove assembly carrier with steering gear ⇒ Chassis ⇒ Rep. gr. 40 .
- Unbolt heat shield for right drive shaft.
- Remove right drive shaft ⇒ Chassis ⇒ Rep. gr. 40 .
- Remove engine cover ⇒ [page 7](#) .
- Remove warm-type clamp -1- between diesel particle filter and exhaust turbocharger.

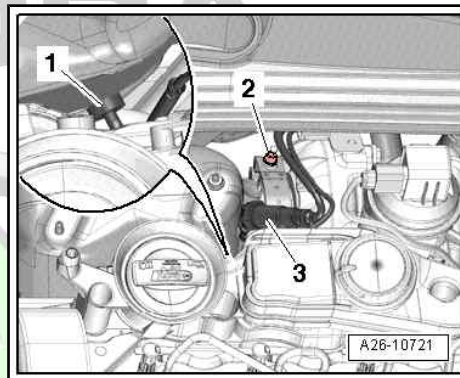


- Disconnect the following plug connections:
 - ◆ Position 2: exhaust gas temperature sender 4 -G648- (orange)
 - ◆ Position 4: lambda probe -G39- (black)
 - ◆ Position 5: exhaust gas temperature sender 3 -G495- (brown)

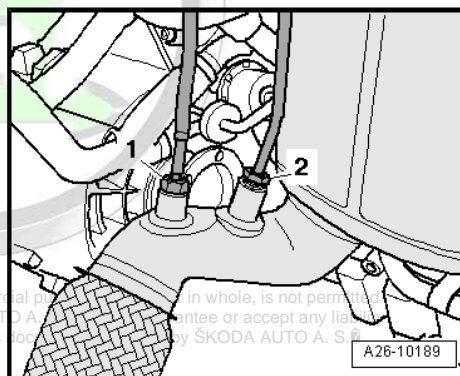




- Remove lambda probe -G39- -3-.



- Unscrew the exhaust gas temperature sender 4 -G648- -1- from the pre-exhaust pipe using the set of tools SW 17 - T10395- .



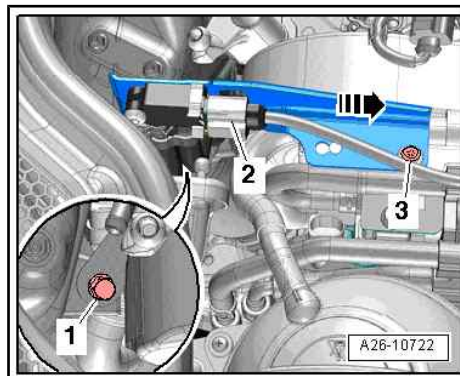
- Disconnect plug -2- at differential pressure indicator -G505- .
- Screw out screw -3- and remove bracket with differential pressure indicator -G505- from the bracket of the additional fuel pump in -direction of arrow-.
- Remove the differential pressure sender -G505- from the bracket with the hoses connected ➔ [page 223](#) .



Caution

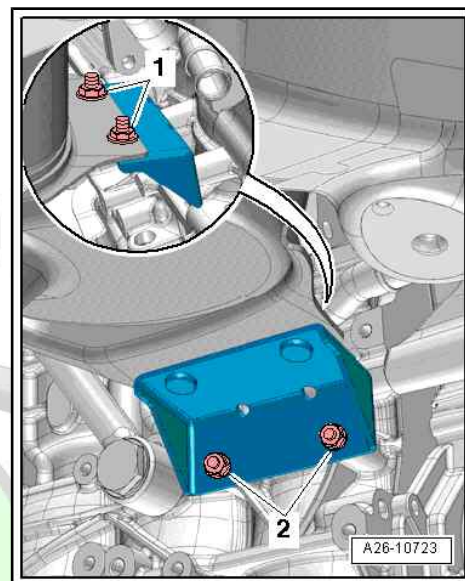
Risk of damage!

- ◆ *The differential pressure sender -G505- is very sensitive and therefore requires the utmost care. It must not touch somewhere when laying it down.*



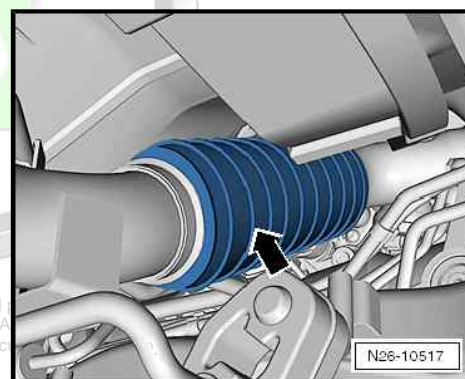
- Attach the differential pressure sender -G505- to the diesel particle filter with the hoses connected.
- Release screw -1- at bracket on cylinder head.
- Slacken the double clamp and slide it backwards.

- Unscrew nuts -1- using the ratchet ring wrench -T10384- .
- Release nuts -2- and remove bracket for pre-exhaust pipe.



Note

- ◆ The assistance of a second mechanic is required for removing the pre-exhaust pipe.
- ◆ The decoupling element in the pre-exhaust pipe should not be bent by more than 10° - risk of damage.
- ◆ Secure the decoupling element with the transport security - T10404- against overtensioning -arrow-

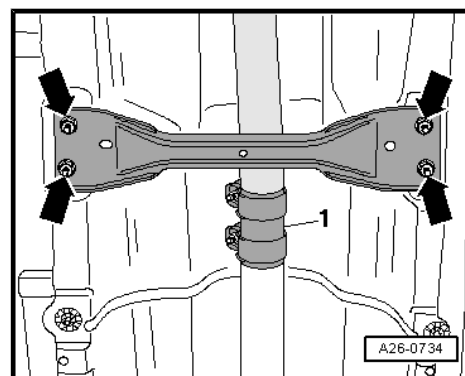


- Remove tunnel bridge -arrows-.
- Remove diesel particle filter downwards.

Install

Note

- ◆ The decoupling element in the pre-exhaust pipe should not be bent by more than 10° and over-tensioned - risk of damage.
- ◆ Secure the decoupling element against damage by means of the transport security -T10404- .



Installation is performed in the reverse order, pay attention to the following points:

- ◆ Replace gasket and fixing clamp for pre-exhaust pipe.
- ◆ Tightening torques ➔ [page 218](#) .
- First fasten the pre-exhaust pipe loosely to the exhaust gas turbocharger and then fasten to the bottom bracket.
- Align exhaust system free of stress ➔ [page 231](#) .

After replacing the diesel particle filter, the adaptation of the ash mass balance must be set to „0“ ➔ Vehicle diagnostic, testing and information system VAS 5051.

1.5 Removing and installing pre-exhaust pipe (for engines with engine identification characters CLCA, CLCB)

Special tools and workshop equipment required

- ◆ Lifting device -MP9-201 (2024A)-
- ◆ Ratchet ring wrench -T10384-
- ◆ Hot screw paste -G 052 112 A3-
- ◆ Pliers for spring strap clamps
- ◆ Transport security -T10403-
- ◆ Bolt M10 x 30

Removing

- Switch off ignition and withdraw ignition key.
- Remove engine cover ➔ [page 7](#) .
- Remove fixing clamp -1- between pre-exhaust pipe and exhaust turbocharger.

On engine with identification characters CLCA

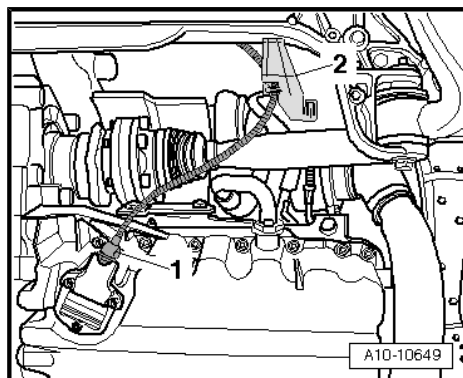
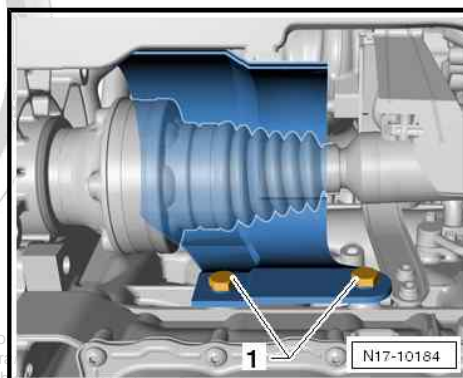
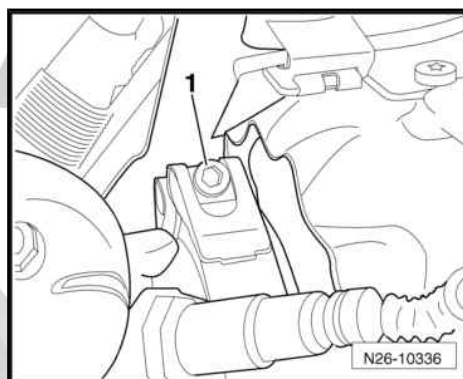
- Release upper screw of bracket for catalytic converter.

On engine with identification characters CLCB

- Release the screw for the top attachment of the diesel particle filter.

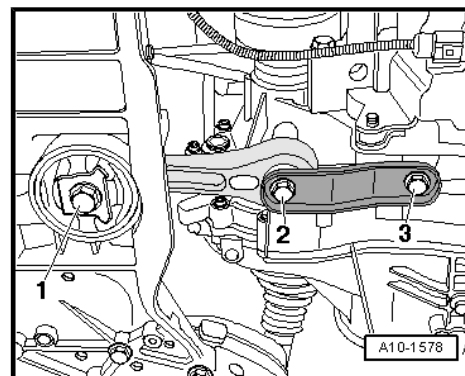
Continued for all engines

- Remove noise insulation ➔ Body Work ➔ Rep. gr. 50 .
- Unscrew screws -1- of protective plate for right drive shaft, if present.
- Remove right drive shaft ➔ Chassis ➔ Rep. gr. 40 .

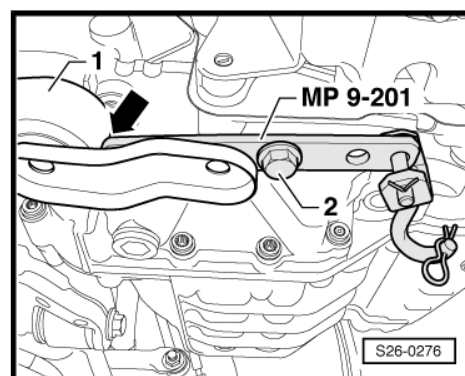


- Disconnect plug -1- from oil level and oil temperature sender -G266- .
- Remove bracket -2- for the wiring harness of the oil level and oil temperature sender -G266- from the assembly carrier.
- Slacken the double clamp and slide it backwards.

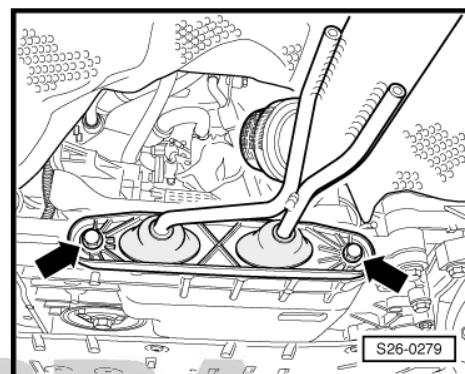
- Screw out screws -2- and -3- of the pendulum support.



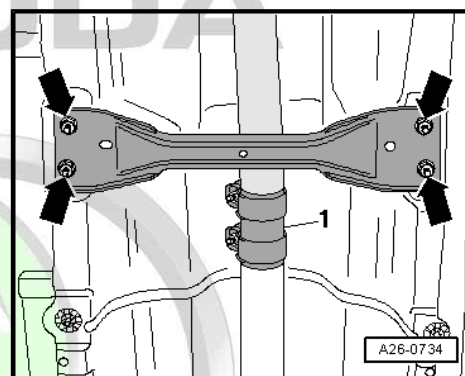
- Push the engine forwards approx. 35 mm and fasten it with the hanger from -MP 9-201- and the screw -2- (M10 x 30) at the pendulum support -1- -arrow-.



- Unbolt bracket for exhaust system -arrows-.

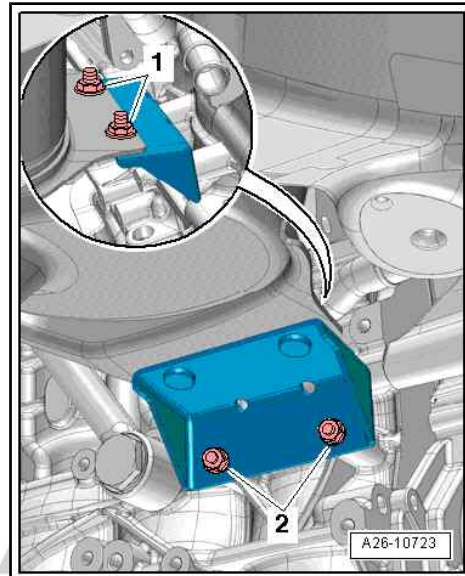


- Unscrew the front cross member -arrows-.



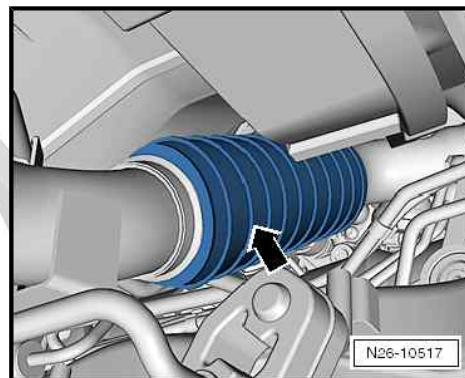


- Unscrew nuts -1- using the ratchet ring wrench -T10384- .
- Unscrew nuts -2- and remove the bracket for the pre-exhaust pipe.



Note

- ♦ The assistance of a second mechanic is required for removing the pre-exhaust pipe.
- ♦ The decoupling element in the pre-exhaust pipe should not be bent by more than 10° - risk of damage.
- ♦ Secure the decoupling element with the transport security - T10403- against overtensioning -arrow-.

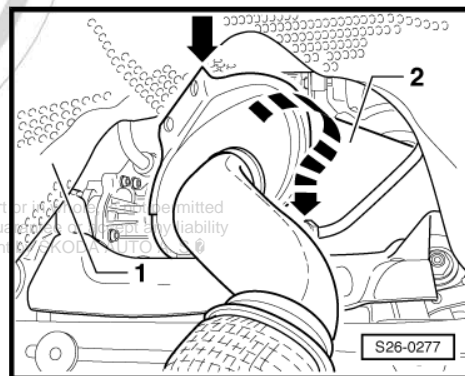


- Turn diesel particle filter -1- by 180° -in direction of arrow- and pull out.



Note

If the bracket should obstruct when pulling out -arrow-, slightly push aside the heat shield -2- if necessary.



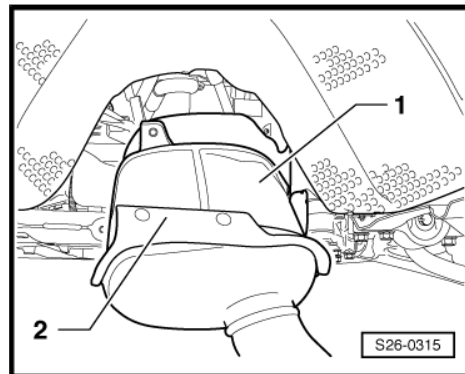
Install

- Insert the pre-exhaust pipe -1- with the bracket -2- upwards as shown and turn to the left by 180°.

Further installation occurs in reverse order. However, pay attention to the following:

- ♦ Replace gasket and fixing clamp for pre-exhaust pipe.
- ♦ Tightening torques ➔ [page 218](#) .
- First fasten the pre-exhaust pipe loosely to the exhaust gas turbocharger and then fasten to the bottom bracket.
- Align exhaust system free of stress ➔ [page 231](#) .

After replacing the diesel particle filter, the adaptation of the ash mass balance must be set to „0“ ➔ Vehicle diagnostic, testing and information system VAS 5051.



1.6 Replacing middle or rear part of the exhaust system

Special tools and workshop equipment required

- ◆ Body saw , e.g. -V.A.G 1523 A- or chain pipe cutter , e.g. -VAS 6254-
- ◆ Protective goggles

Work procedure



Note

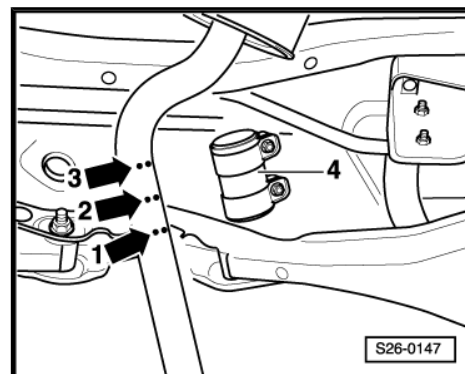
- ◆ For individually replacing the middle or rear part of the exhaust system, a separation point is provided in the connecting pipe.
- ◆ The separation point is marked by indentation on the circumference of the exhaust pipe.



WARNING

In order to avoid injuries because of metal swarfs, wear safety goggles and safety clothing.

- Separate exhaust pipe at right angles at the separation point -arrow 2-.
- When installing, position double clamp -4- at the side markings -arrow 1- and -arrow 3-.
- Rotate the double clamp -4- in such a way that the ends of the screws are as far upwards as possible.
- Align rear part of exhaust system horizontally and tighten double clamp to 25 Nm.
- Align exhaust system free of stress ➔ [page 231](#) .



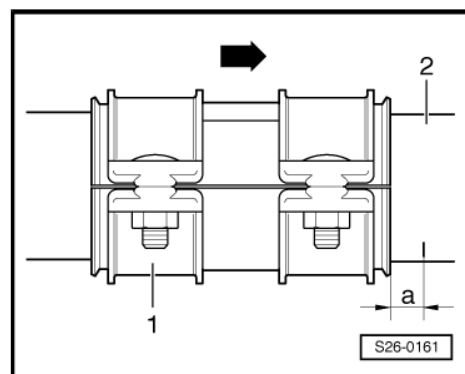
1.7 Aligning exhaust system free of stress

- The exhaust system is aligned when cold.
- Slacken front double clamp -1- and align to pre-exhaust pipe -2- (-arrow- points in direction of travel).
- a- = 5 mm

The fixing screws must be on the right. They must not protrude beyond the bottom edge of the double clamp.

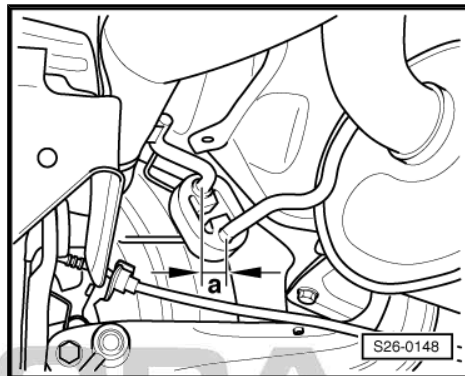
- Tighten the front nut by hand.

Vehicles with front-wheel-drive



- Push the exhaust system so far forward until the initial load on the rear retaining strap at the middle part of the exhaust system -a- = 9...11 mm.

Vehicles with four-wheel drive

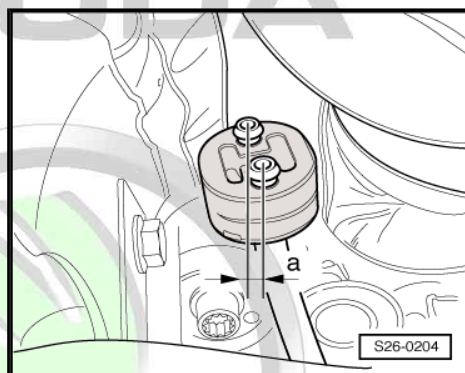


- Push the exhaust system so far forward until the initial load on the rear retaining strap at the middle part of the exhaust system -a- = 7...9 mm.

Continued for all vehicles

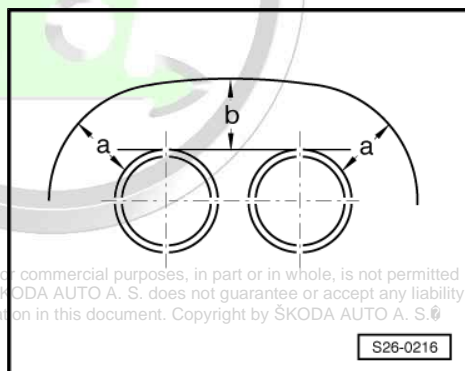
- Tighten the nuts of the front double clamp evenly to 23 Nm.

Align exhaust tailpipes



- Align rear part of exhaust system:
 - There must be an equal distance -a- between bumper opening and exhaust tailpipe.
 - The distance -b- from the bumper opening to the exhaust tailpipes is equal.

For aligning, loosen the hangers of the exhaust gas system.



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1.8 Inspecting the exhaust system for leak-tightness

- Start engine and run in idle.
- Seal off exhaust tailpipes for the duration of the leak check (e.g. with cloth or plug).
- Inspect connection points of cylinder head/exhaust manifold, exhaust gas turbocharger/pre-exhaust pipe etc. for leaktightness by listening and visual inspection.
- Eliminate any leak found.

2 Exhaust gas recirculation system



Note

- ◆ The exhaust gas recirculation system is operated by the engine control unit -J623- for EGR valve -N18-.
- ◆ The EGR valve -N18- consists of the mechanical valve, the EGR control motor -V338- and the EGR potentiometer -G212-.
- ◆ The electrically controlled valve with cone-shaped valve plunger makes it possible to achieve a uniform modification of the passage diameter depending on the stroke.
- ◆ Always replace self-locking nuts.

2.1 Exhaust gas recirculation with radiator - Summary of components

Part I

1 - 9 Nm

2 - Connecting pipe

- ☐ to cylinder head



Caution

Pay attention that the bellows of the connection pipe is not bent or overstretched. There is a risk of crack formation.

3 - 9 Nm

4 - Gasket

- ☐ replace

5 - Vacuum line

- ☐ do not change bending form
- ☐ Connection diagram for vacuum hoses
⇒ [page 171](#)

6 - 9 Nm

7 - Gasket

- ☐ replace

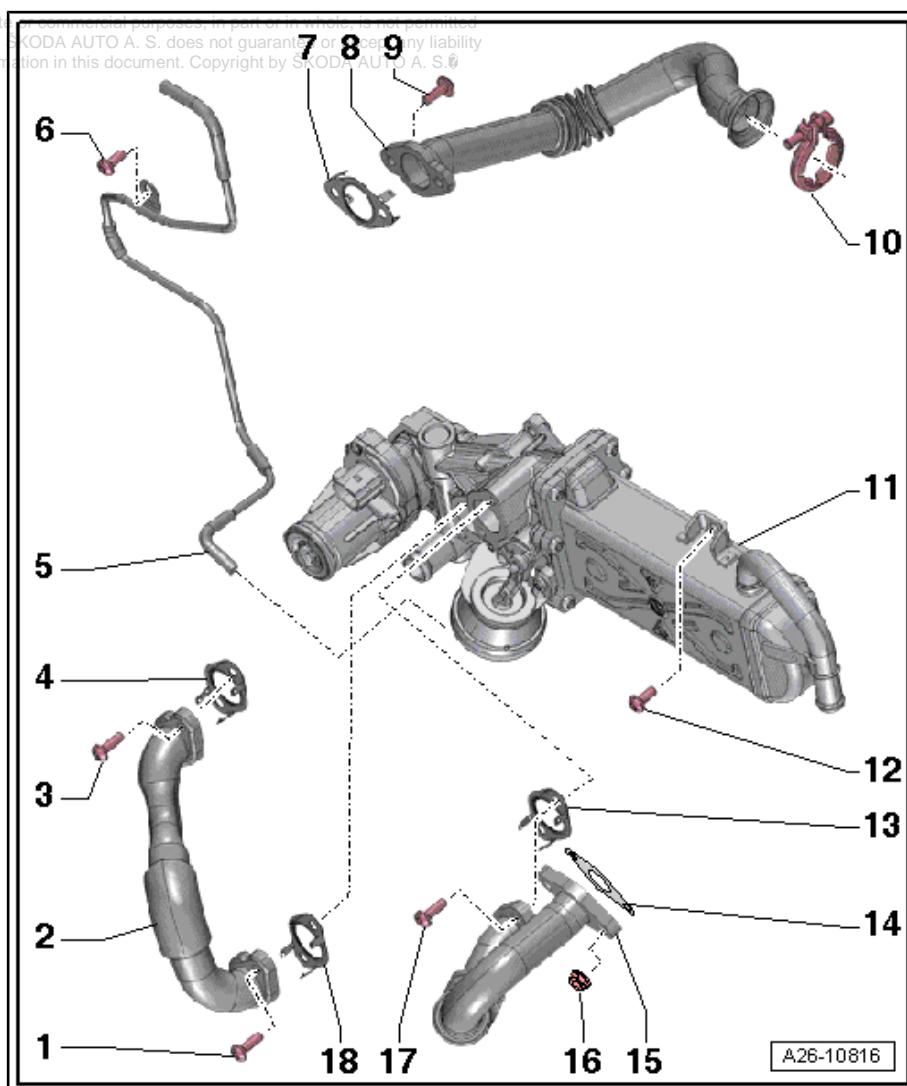
8 - Connecting pipe

- ☐ To intake manifold



Caution

Pay attention that the bellows of the connection pipe is not bent or overstretched. There is a risk of crack formation.





9 - 9 Nm

10 - Warm-type clamp, 5 Nm

11 - Radiator

- ☐ for exhaust gas recirculation
- ☐ with exhaust gas recirculation valve -N18-
- ☐ with bypass flap
- ☐ removing and installing ⇒ [page 236](#)

12 - 9 Nm

13 - Gasket

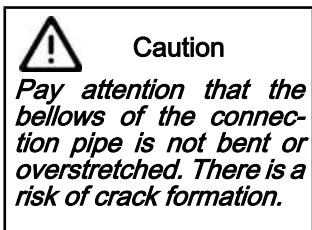
- ☐ replace

14 - Gasket

- ☐ replace

15 - Connecting pipe

- ☐ from exhaust manifold



16 - 22 Nm

17 - 9 Nm

18 - Gasket

- ☐ replace

Part II

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1 - 20 Nm

2 - Connecting pipe

- ☐ to cylinder head
- ☐ Replace gasket



Caution

Pay attention that the bellows of the connection pipe is not bent or overstretched. There is a risk of crack formation.

3 - Connector

- ☐ for exhaust gas recirculation valve -N18-

4 - 20 Nm

5 - 10 Nm

6 - 20 Nm

7 - Connecting pipe

- ☐ from exhaust manifold
- ☐ Replace gasket



Caution

Pay attention that the bellows of the connection pipe is not bent or overstretched. There is a risk of crack formation.

8 - 20 Nm

9 - Hose

- ☐ for coolant
- ☐ with clamp

10 - Radiator

- ☐ for exhaust gas recirculation
- ☐ with exhaust gas recirculation valve -N18-
- ☐ with bypass flap
- ☐ removing and installing ➤ [page 236](#)

11 - Vacuum setting element

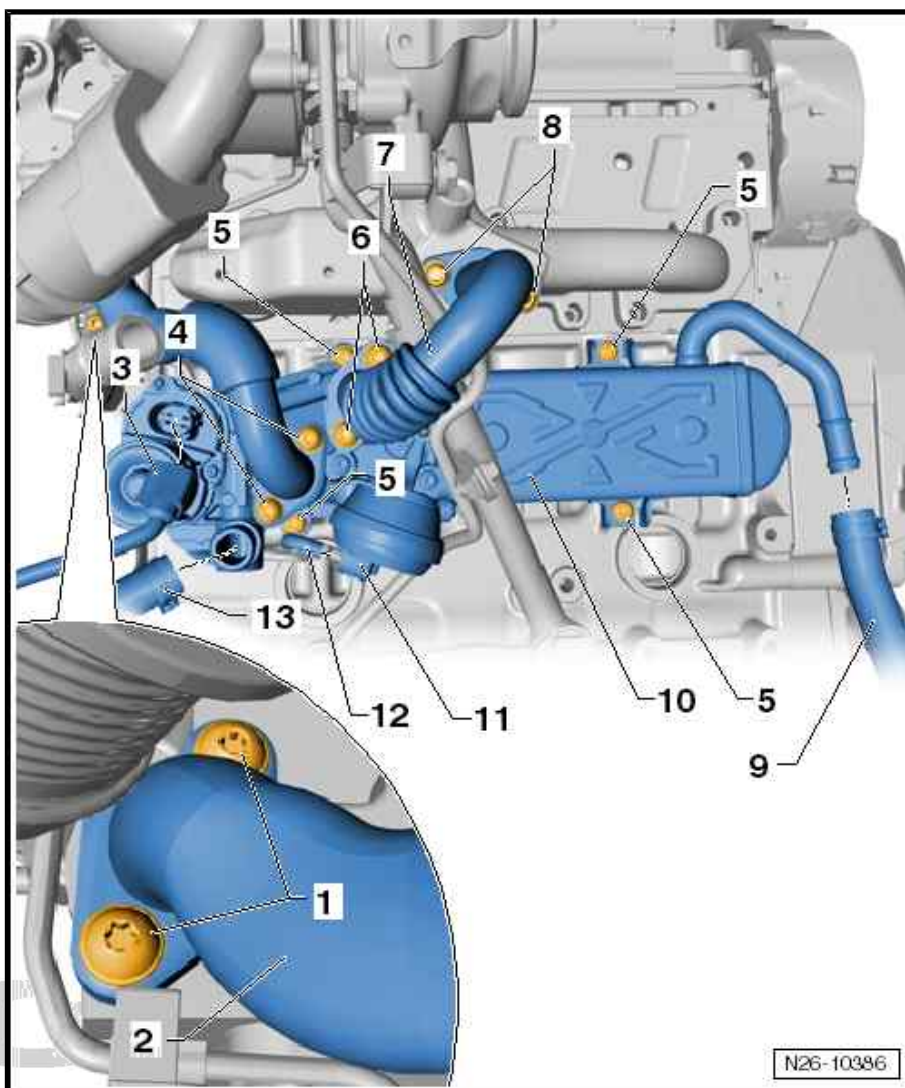
- ☐ Change-over of bypass flap

12 - Vacuum line

- ☐ Connection diagram for vacuum hoses ➤ [page 171](#)

13 - Hose

- ☐ for coolant
- ☐ with clamp



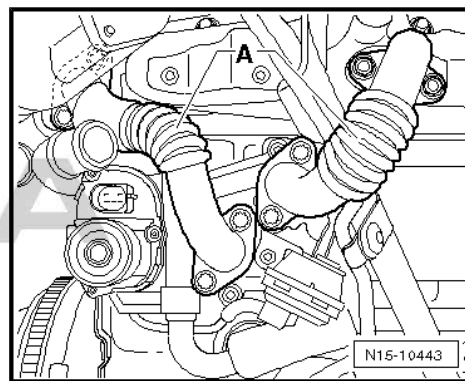
2.2 Removing and installing radiator for exhaust gas recirculation with exhaust gas recirculation valve -N18-

Special tools and workshop equipment required

- ◆ Hose clamps up to Ø 25 mm -MP7-602 (3094)-
- ◆ Catch pan e.g. -VAS 6208-
- ◆ Pliers for spring strap clamps
- ◆ Socket insert XZN 10 -T10385-
- ◆ Old oil collecting and suction equipment , e.g. -V.A.G 1782-

Removing

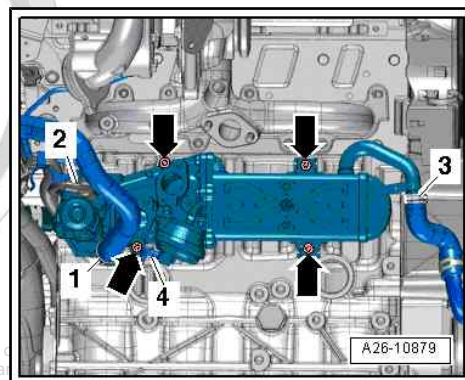
- Remove engine cover ➔ [page 7](#) .
- Remove air filter with air mass meter -G70- ➔ [page 214](#) .
- Remove battery and battery tray ➔ Electrical System ➔ Rep. gr. 27 .
- Remove pre-exhaust pipe:
 - ◆ Engine identification characters CFHC, CFHF ➔ [page 225](#)
 - ◆ Engine identification characters CLCA, CLCB ➔ [page 228](#)
- Remove connection pipes -A- from cylinder head and from exhaust manifold using the socket insert XZN 10 -T10385- .
- Remove oil feed and oil return-flow line with support for exhaust turbocharger ➔ [page 165](#) .
- Collect escaping engine oil with the old oil collecting and suction equipment -V.A.G 1782- .
- Remove vacuum line to vacuum setting element ➔ [Item 11 \(page 235\)](#) .
- Disconnect the plug from the exhaust gas recirculation valve -N18- .
- Pinch off the coolant feed hose and the coolant return hose of the radiator for exhaust gas recirculation with hose clamps -MP7-602 (3094)- and detach the hoses.
- Collect escaping coolant with the catch pan -VAS 6208- .
- Release screws -arrows- and remove radiator for exhaust gas recirculation with exhaust gas recirculation valve -N18- .



Install

Installation is performed in the reverse order, pay attention to the following points:

- ◆ Replace the gaskets, the sealing rings and the self-locking nuts.
- ◆ Secure all hose connections with spring strap clamps.
- ◆ Tightening torques ➔ [page 233](#) .
- Inspect coolant level, top up with coolant if necessary ➔ [page 115](#) .



2.3 Checking change-over flap for radiator for exhaust gas recirculation

Special tools and workshop equipment required

- ◆ Hand vacuum pump , e.g. -VAS 6213-

Work procedure



Note

The vacuum setting element for change-over flap is accessible from below.

- Remove noise insulation ⇒ Body Work ⇒ Rep. gr. 50 .
- Unbolt heat shield for right drive shaft.
- Detach vacuum hose from vacuum setting element.
- Connect hand vacuum pump to vacuum setting element.
- Actuate the hand vacuum pump in order to generate negative pressure.
- The vacuum setting element must open the change-over flap up to the stop at max. 0.08 MPa (0.8 bar) negative pressure and in case of ventilation close it up to the stop -arrows-.

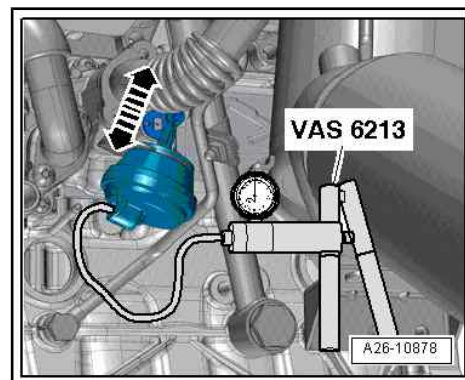


Note

- ◆ *For this test the opening of the change-over flap can be performed in jolts. In driving mode the change-over flap opens due to the larger negative pressure.*
- ◆ *The closing of the change-over flap must be carried out suddenly when ventilating (e.g. detach vacuum hose).*

If the vacuum setting element does not open or close the change-over flap up to the stop:

- Replace radiator for exhaust gas recirculation with vacuum setting element ⇒ [page 236](#) .



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28 – Glow plug system

1 Glow Plug System

1.1 Removing and installing glow plugs



Note

Metal glow plugs are installed in this engine.

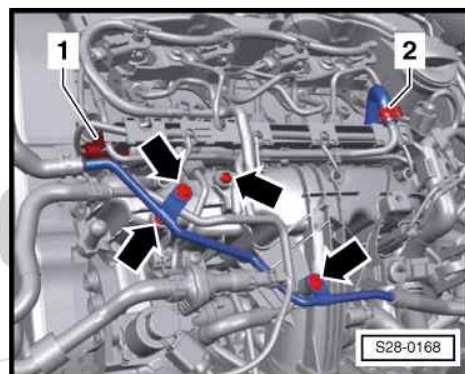
Special tools and workshop equipment required

- ◆ Flexible-head wrench SW 10 , e.g. -3220-
- ◆ Cleaning and degreasing agent , e.g. -D 000 401 04-
- ◆ Protective goggles and gloves

Removing

Observe all safety measures and notes for assembly work on the fuel and injection system as well as the rules for cleanliness
⇒ [page 2](#) .

- Switch off ignition and withdraw ignition key.
- Remove engine cover ⇒ [page 7](#) .
- If present, remove the noise insulation at the injection units.
- Disconnect plug -1- at fuel pressure sender -G247- .
- Release fixing screws -arrows- of top coolant pipe and the fuel return-flow pipe.
- Detach the hose -2- from the pipe of the fuel return-flow line.

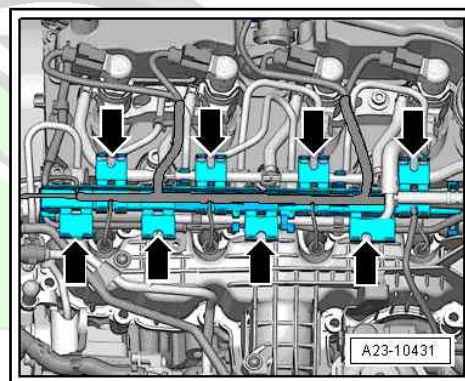


- Open the catches -arrows- of the cable guide and slacken the wiring loom.



Caution

- ◆ *Carefully disconnect the plug from the glow plugs.*
- ◆ *If the plug is damaged when disconnecting it, the complete wiring loom including the plugs must be replaced (plugs cannot be replaced separately).*



- Carefully disconnect the plug from the glow plugs. Use the assembly spanner SW 12 for help.



WARNING

Wear protective gloves and protective goggles when working with grease remover!

- Clean the glow plug and the hole in the cylinder head with great care.



Note

No dirt must get into the cylinder.

When cleaning, for example:

1. Suction off heavy dirt using a vacuum cleaner.
 2. Spray grease remover and cleaning agent onto the glow plug and into the hole around the plug, let it take effect for a short period of time and blow out with compressed air.
 3. Clean the glow plug and the channel around the plug with a cloth soaked in oil.
- Slacken the glow plug with a flexible-head wrench 10 -3220- and release.

Install

Installation is carried out in the reverse order; pay attention to the following points:

- Screw in the glow plug with a flexible-head wrench 10 -3220- and tighten.
- ◆ Tightening torque: 16 - 18 Nm
- Fit the plug again onto the relevant glow plugs and check for firm seating.
- Interrogating and erasing fault memory of engine control unit
⇒ Vehicle diagnostic, testing and information system VAS 5051.



Note

After deleting the fault memory of the engine control unit the readiness code must be re-generated.

